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# Assessment of the Conditions for a European Union Location Framework

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## Contents

## Tables



## Figures

## Abbreviations

| | |
|---|---|
| ADAS | Advanced Driver Assistance Systems |
| ADMS | Description Metadata Schema |
| AIXM | Aeronautical Information Exchange Model |
| ARE3NA | A Reusable INSPIRE Reference Platform |
| ATM | Air traffic management |
| CEN | European Committee for Standardisation |
| CISE | Common Information Sharing Environment |
| COGI | Commission Inter-service Group on Geographic Information |
| DG | Directorates-General |
| DwC-A | Darwin Core Archive |
| EC | European Commission |
| EFIR | European Federated Interoperability Repository |
| EIA | European Interoperability Architecture |
| EIF | European Interoperability Framework |
| EIS | European Interoperability Strategy |
| ELF | European Location Framework |
| EML | Ecological Metadata Language |
| ERTMS | European Rail Traffic Management System |
| EU | European Union |
| EULF | European Union Location Framework |
| G2B | Government-to-Business |
| G2C | Government-to-Citizens |
| G2G | Government-to-Government |
| GBIF | Global Biodiversity Information Facility |
| GI | Geographic information |
| GIS | Geographic information system |
| GMES | Global Monitoring for Environment and Security |
| ICT | Information and communication technology |
| IHO | International Hydrographic Organisation |

| | |
|---|---|
| INSPIRE | Infrastructure for Spatial Information in Europe |
| ISA | Interoperability Solutions for European Public Administrations |
| ISO | International Organisation for Standardisation |
| ITS | Intelligent transport system |
| JRC | Joint Research Centre |
| MIG | Maintenance and Implementation Group |
| NSDI | National Spatial Data Infrastructure |
| NUTS | Nomenclature of Units for Territorial Statistics |
| OASIS | Organisation for the Advancement of Structured Information Standards |
| OGC | Open Geospatial Consortium |
| RIS | River Information Services |
| SafeSeaNet | Safe Sea Network |
| SDI | Spatial Data Infrastructure |
| SEIS | Shared Environmental Information System |
| SES | Single European Sky |
| SESAR | Single European Sky ATM Research Programme |
| TN-ITS | Transport Network ITS |
| UN-GGIM | UN initiative on Global Geospatial Information Management |
| W3C | World Wide Web Consortium |
| WFS | Web Feature Service |
| WISE | Water Information System for Europe |

## Executive Summary

**The European Union Location Framework (EULF)** aims to maximise the benefit from the vast amount of money spent on location-related information and services by governments across Europe by promoting a best practice approach for cross-sector and cross-border sharing and use of this information. The EULF is developed under the ISA programme which supports interoperability solutions, sharing and reuse among European Public Administrations through the creation of frameworks, architectures and re-usable components to enable more cost effective e-Government services and support cross-border applications. The EULF will organise activities into a number of focus areas which are critical to the successful use of location information and delivery of services using this information. In the first phase, an initial set of five focus areas was selected: Policy and Strategy Alignment, e-Government Integration, Standardisation and Interoperability, Cost Benefit Focus, and Committed Partnerships.

The shared vision and rationale for a European Union Location Framework is presented in the 'EULF Strategic Vision v0', which also defines its scope, the key changes that are being targeted, and the stakeholder and governance approach. This report **'Assessment of the Conditions for a EULF'** provides an assessment of the state of play in the different focus areas of the EULF and the need for EULF action in these areas. In this report the use and integration of location information is assessed at different levels. The report explores the relevance and importance of location information in different policy areas, policy themes and different types of policy actions, but also looks at the processes through which the implementation of policies takes place, and how these processes make use of location information. For collecting the information used in this assessment, different methods were applied in order to capture and analyse a maximum of information and to maximise interaction with stakeholders. The assessment provides new findings on the five focus areas.


A necessary condition for realising the full potential of location information is the **integration of location information in e-Government.** The assessment demonstrates that in many processes that might benefit from a better and wider use of location information, the current use and the integration of location information is still low. Especially in key e-Government processes, location information is hardly used and integrated. The better integration of location information in e-Government requires additional efforts at strategic and organisational level. Member States now follow different approaches to facilitate the integration of location information in e-Government. At this moment no Member State has location information fully integrated in e-Government policy, but some Member States have taken successful action in certain areas to stimulate the integration of location information. Good practices in facilitating and stimulating the integration of location information in e-Government include the recognition of the

relevance and importance of location information in e-Government strategies, the definition of an integrated data policy for location and non-location data, strong collaboration and coordination between the e-Government and the GI community and technical solutions to embed location information and location based services in regular business processes and the applications supporting them.

**Alignment of policies, strategies and legislation** at EU and Member States' levels dealing with location information or where location information plays a significant role. The assessment shows that within existing (thematic) policies, legislation, and strategies, location aspects are often addressed in insufficient or inconsistent ways, causing duplications, contradictions, and gaps. While in some of the EU policies and legislation reference is made to the INSPIRE Directive 2007/2/EC and related legislation, in many other policy areas this is not the case. But even a general reference to INSPIRE is in fact not enough, and additional effort is needed to define in more detail how alignment can be achieved from the legal, organisational and technological perspective. Also in procurement the way reference is made to INSPIRE and/or location information is very variable and often rather vague. Key documents related to INSPIRE are not mentioned and requirements are formulated to define new data models or to collect existing data without making use of INSPIRE components. At Member State level, additional effort is needed to align policies, although some Member States have already taken successful actions on aligning policies and strategies.

**Standardisation and interoperability** frameworks exist in ICT, e-Government and GI-communities, and also in different thematic and policy areas, leading to a comprehensive set of standards and specifications. For the successful integration of location information in e-Government processes, it is however necessary to analyse the specific requirements for these processes, to integrate these requirements in standardisation efforts and to permanently align standardisation and interoperability initiatives of different communities and policy areas through joint efforts. Member States but also other stakeholders could benefit from a more active involvement in the standardisation processes. Current knowledge about and active application of INSPIRE specifications is relatively weak, which might impede the successful implementation of INSPIRE and cause potential barriers for the integration of location information in e-Government processes. However, the assessment of standardisation efforts at EU and Member State also revealed several good practices of the alignment of standards, interoperability and standards strategies, and the application of standards, as well as the definition of interoperability initiatives in particular sectors (e.g. CISE in the Maritime sector). Good examples are the development of standard web services as re-useable components that can be integrated in several sectors, the preparation of architectural documents integrating and explaining the relevant location information and e-Government standards, and the application of semantic standards as a basis for the development of authentic registers.

It is expected that the integrated use of location information in governmental processes will deliver a **wide range of benefits**, not only to public administrations themselves but also to society in general. The assessment however exposes the absence of a wide and general recognition of the benefits of using and integrating location information. Relatively little effort is done to monitor and communicate the benefits of location information and the evidence that is provided often is not based on observations but consists often on opinions and expectations. The development and implementation of a consistent and systematic approach to measure the benefits allows monitoring changes and trends in the benefits of location information through time. Some Member States have already taken first steps towards the development of such an approach. The assessment showed that an effective benefits measurement approach should focus on different types of benefits, including the benefits for government itself but also benefits to citizens and businesses, and even broader socio-economic benefits. Moreover, benefits of location information can be measured at different levels: although policy makers might be more interested in a government wide assessment of the benefits of location information, benefits are often more visible and more pronounced at organisational level and at process level.

Many initiatives or communities are developing approaches to the sharing and use of location information, so it is essential for the establishment of the EULF that **committed partnerships** are developed to share good practices and ensure that different initiatives take account of respective needs and expectations and build on what each is doing. Partnerships are not only essential in establishment of the EULF, but also in realising the integration of location information in the context of public sector processes. As government processes often involve many stakeholders, including public authorities at different administrative levels but also organisations and actors outside the public sector, the establishment of effective partnerships is needed to ensure the involvement of all stakeholders and the effective use of location information in processes.

In conclusion, the assessment clearly underlines the relevance and importance of e-government integration, policy and strategy alignment, standardisation and interoperability, a cost-benefit focus and committed partnerships as key issues for realising and maximising the benefits of location-related information and services. There are several good practices, demonstrating that these issues can be addressed and benefits for governments citizens and businesses can be delivered. However, these good practices are not universally-deployed and there are some significant gaps. The assessment also identified other relevant issues, including the need for effective leadership and governance, a user driven approach, an open and balanced data policy, training and awareness raising, and appropriately targeted funding. **There is therefore a need for an EULF, to build on the good practices and breadth of interest from Member States to develop a framework of guidance and actions that will foster interoperable cross-sector and cross-border sharing and use of location information.**

The results of this assessment of the conditions will be used for the elaboration of the EULF Blueprint and EULF Roadmap, together with the EULF Strategic Vision and consultations with different stakeholder communities. The EULF Blueprint will contain methodologies, recommendations, guidelines and best practices in the five focus areas: Policy and Strategy Alignment, e-Government Integration, Standardisation and Interoperability, Cost Benefit Focus, and Committed Partnerships. A high level implementation plan for the EULF will be provided in the EULF Roadmap.

# 1. Introduction

Over the past ten years important efforts have been made to improve the access and sharing of location information, e.g. through the INSPIRE and the GMES/ Copernicus legal acts at European level, and the development of Spatial Data Infrastructures at national and regional level. However, it is expected that European Union institutions and Member State public administrations alike could benefit from the potential of a consistent and integrated use of location information, taking also into account new developments such as the revision of the PSI Directive and the G8 Charter on Open Data. This is particularly the case in communities that are – or feel – not directly affected by the INSPIRE legislation.

In the context of the Interoperability Solutions for European Public Administrations (ISA) programme [1], the Action "Establishment of a European Union Location Framework" (EULF)[2] is identifying barriers and possible solutions for a consistent and interoperable use of location information and services, while promoting the re-use of INSPIRE where possible and feasible. The ISA programme supports interoperability solutions, sharing and reuse among European Public Administrations through the creation of frameworks, architectures and re-usable components to enable more cost effective e-Government services and support cross-sector and cross-border applications. The EULF will deliver the location framework that underpins this broader vision.

The first step for the EULF is a project that assesses the state of play in different focus areas and targets actions required for the successful use of location information and delivery of services using this information. This project is co-ordinated by the EC Joint Research Centre (JRC). The work is done in close cooperation with a number of Commission services, including the Directorate-General for the Environment and the Directorate-General for Informatics. The EULF will organise activities into a number of focus areas which are critical to the successful use of location information and delivery of services using this information. In the first phase, an initial set of five focus areas was selected: Policy and Strategy Alignment, e-Government Integration, Standardisation and Interoperability, Cost Benefit Focus, and Committed Partnerships. These EULF focus areas provide a framework for assessment and a framework for concrete action.

The shared vision and rationale for an EULF, the scope, the key changes that are being targeted, and the stakeholder and governance approach were defined in the 'EULF Strategic Vision v0'[3]. The initial phase of the EULF project also includes an Assessment of the state of play in the five priority focus areas. This Assessment of the Conditions for the EULF provides a picture of the state of play at both European and national levels regarding the integration of location information within e-Government. It is based on the 'EULF Strategic Vision' and draws on a survey undertaken with Member States between June 2013 and October 2013. The Assessment of the Conditions of the EULF provides the necessary input to formulate

[1] http://ec.europa.eu/isa/
[2] http://ec.europa.eu/isa/actions/02-interoperability-architecture/2-13action_en.htm
[3] http://ec.europa.eu/isa/actions/documents/isa-2.13_eulf-strategic-vision-lite-v0-3_final_en.pdf

recommendations, to define the required guidance documents and the actions needed to put the EULF in place.

The aim of this report – which is the result of a contract awarded in the frame of the EULF Action – is to summarise the findings of the assessment of the state of play, based on information gathered from Commission DGs and Member States. The remainder of report is structured as follows: Chapter 2 discusses the need to analyse the use and integration of location information at different levels. Chapter 3 describes the approach that was followed in this assessment. Chapter 4 focuses on the integration of location information within government processes and the actions, structures and measures to support this integration (focus area 1). Chapter 5 provides a first assessment of the level of alignment of policies and legislation dealing with location information (focus area 2). Chapter 6 analyses the required standards for interoperability and assess the standardisation efforts by in the Member States (focus area 3). Chapter 7 aims to identify the benefits of improved policy alignment, e-Government integration and the use of standards (focus area 4). Chapter 8 discusses the importance of strategic partnerships for realising the EULF objectives (focus area 5). Chapter 9 summarises the conclusions of the assessment.

## 2. Use of location - from policies to processes

*The aim of this chapter is to provide a deeper insight into the role of location information in government, and to understand the use and the potential use of location information across policy areas and their related actions and their associated processes, products and services.*

### *2.1 Overview of the use and potential use of location information in policy areas and actions*

Location information is relevant to a wide variety of Commission policy areas, policy themes and actions even though some areas are more significant than others in terms of the potential impact of INSPIRE and the EULF. The relevance of location information to policies in the EU Acquis is described in Table 1. The table is based on a high level subjective review of the contents of the Acquis made by the ARE3NA[4] action and an examination of some of the legal acts and implementation activities. We also identify the priorities for immediate attention, through an analysis of the 2013 Commission Work Programme and the current activities in the DG Management Plans.

***Table 1 Relevance of Location Information to Policies in the EU Acquis***

| RELEVANCE OF LOCATION INFORMATION TO POLICIES IN THE EU ACQUIS | | |
|---|---|---|
| LOW | MEDIUM | HIGH |
| Competition policy | Animal protection | Agriculture |
| Customs tariffs | Coal industry promotion | Energy |
| Development policy | European citizenship | Environment, consumers and health protection |
| Economic and monetary policy | Free movement of persons | External relations |
| European countries | Freedom, security and justice | - environmental cooperation |
| Financial / institutional matters | Freedom to provide services | - transport cooperation |
| Foodstuffs | Industrial policy and internal market | Fisheries |
| Free movement of goods | Origin of goods | Foreign and security policy |
| Intellectual property law | People's Europe | Regional policy |
| Market access | Plant health | Science, information, education and culture |
| Market monitoring | Police cooperation | Transport |
| Mediterranean countries | Shipping | |
| Public works contracts | Statistics | |
| Refugees / displaced persons | | |
| Social policy | | |
| Textiles | | |

Specific policies in each area will be at different stages of evolution in terms of their formulation, implementation and revision. The most fruitful conditions where the EULF can potentially be of value are where location information is both highly

[4] ARE3NA is another action in the ISA Programme. It is delivering a series of re-usable components to help in building applications based on INSPIRE.

relevant to the policy and the policy has imminent changes planned which are likely to involve location information.

To help identify current policy priorities and actions involving location information, an assessment has been made of the Commission Work Programme for 2013. According to the Commission Work Programme for 2013, the "absolute imperative is to tackle the economic crisis and put the EU back on to sustainable growth". The potential relevance of location information and the EULF in the seven key areas in the work programme is described in Table 2.

***Table 2 Location Information / EULF Relevance in the EC 2013 Work Programme***

| AREAS OF WORK PROGRAMME | LOCATION INFORMATION / EULF RELEVANCE |
|---|---|
| A genuine economic and monetary union | Better information on location of resources |
| Boosting competitiveness through the single market and industrial policy | Reducing barriers to entry through easier access to data and adoption of common standards, including guidelines on procurement; increased innovation with use of new technologies, enabling the digital single market as part of the Digital Agenda for Europe; making better use of data published by INSPIRE and generated by Galileo and Copernicus; driving down the cost of building applications through increased access to data and a focus on standards, interoperability and re-use; support to developments in key sectors requiring access to location-related information, e.g. energy, construction. |
| Connect to compete: building tomorrow's networks today | Making location information easily accessible across networks; promoting best practice approaches for access to data on the web; reducing costs and providing a level playing field through increased interoperability; supporting developments in the transport sector, where location-related information from multiple sources is vital (e.g. ITS, route planning, infrastructure). |
| Growth for jobs: inclusion and excellence | Enabling new business opportunities, training for new skills and support to labour mobility through use of standardised best practices; development of a community of practitioners; supporting the potential for growth in IT-related opportunities. |
| Using Europe's resources to compete better | Environmental data being published through INSPIRE is highly relevant. EULF will help ensure this data can be used effectively and easily in building new applications, through its focus on wider interoperability and cross-border support. The EULF will also focus on the alignment of approaches to facilitate better analysis and decision-making (working with SEIS). Importance of location-related information for tackling marine sustainability. |
| Building a safe and secure Europe | Better access to and use of information in dealing with emergencies. Use of standards supports co-operation of police forces, tackling cross-border issues such as pollution, food safety, natural disasters. |
| Pulling our weight as a global actor | Building on the world-leading approach being implemented with INSPIRE and Europe's strong position |

| AREAS OF WORK PROGRAMME | LOCATION INFORMATION / EULF RELEVANCE |
|---|---|
| | in e-Government to align these two areas more effectively; working with UN-GGIM Europe on input to UN policy on geospatial management. |

The priorities given to European networks, IT, developing new skills, growth, jobs, and resource efficiency align well with the aims and objectives of the EULF. Location information is key to many policies and there are huge opportunities to use this information more effectively and efficiently in cross-border and cross-sector contexts building on INSPIRE. Significant cost savings and innovations are possible through increased access to large amounts of geospatial data and a focus on interoperability and reuse. From this, new business opportunities may be developed, jobs created and competitiveness enhanced.

At a more detailed level, Table 3 lists the key actions – legislative and non-legislative - being undertaken by the Commission involving location information where the EULF may be relevant. This is taken from the Annex to the Commission Work Programme 2013, and the DG Management Plans and Roadmaps. The list shows both actions which are being initiated in 2013 and those that are ongoing, having been initiated in previous years.

***Table 3 Current EC Actions with Location / EULF Relevance***

| DG | ACTIONS | POLICY AREA[5] | SOURCE | |
|---|---|---|---|---|
| | | | CWP | OTHER |
| *AGRI* | Review of EU political and legal framework for organic Production | Agriculture | X | |
| | State aid package for agriculture and forestry 2014-20 | Agriculture | | X |
| | CAP transitional rules for 2014 | Agriculture | | X |
| | Anti-fraud (LPIS-GIS/IACS) updates | Agriculture | | X |
| | Future prospects for plant proteins | Agriculture | | X |
| *CLIMA* | EU Strategy on adaptation to climate change | Environment | X | |
| *CLIMA / ENER* | 2030 framework for climate and energy policies | Environment, Energy | | X |
| *CNECT* | Reducing the costs of broadband infrastructure deployment | Industrial policy and internal market | X | |
| | Council Regulation Setting up a Public Private Partnership for Electronic Components and Embedded Systems | Industrial policy and internal market | X | |
| | EP and Council Decision on the participation of the Community in the follow-up to Ambient Assisted Living (AAL) Joint Programme | Science, information, education and culture | X | |
| | Options for Encouraging Enterprises to License Interoperability Information | Industrial policy and internal market | | X |

[5] Policy areas as indicated in the analysis of the EU Acquis in Table 2

| DG | ACTIONS | POLICY AREA[5] | SOURCE | |
|---|---|---|---|---|
| | | | CWP | OTHER |
| *DIGIT* | ISA work programme | Information | | X |
| *DEVCO* | Implementing Rules (IR) for the ENI Cross-border cooperation (CBC) 2014-2020 | Development policy, External relations | | X |
| | Implementation plan on boosting food and nutrition security | Development policy | | X |
| | Council regulation on the implementation of the 11th European Development Fund | Development policy | | X |
| | Awareness raising towards the European Year for Development 2015 | Development policy | | X |
| *EAC* | Opening up education | Education | | X |
| *EEAS* | Comprehensive Approach to Crisis Management outside the EU | External Relations, Environment | X | |
| *EMPL* | Social Investment for Growth and Cohesion – including implementing the ESF 2014-2020 | Social Policy | X | |
| *ELARG* | Enlargement package 2013 | European countries | X | |
| *ENER* | Energy Technologies and Innovation in a future European Energy Policy | Energy | X | |
| | Proposal for Regulation on notification of investment projects in energy infrastructure | Energy | | X |
| *ENTR* | Update of the Action plan on GNSS Applications | Industrial policy and internal market | | X |
| | European Innovation Partnership on Raw Materials Strategic Implementation Plan | Industrial policy and internal market | | X |
| | European Innovation Partnership on Water - support for implementation | Industrial policy and internal market, Environment | | X |
| | e-Leadership for fast growing SMEs | Industrial policy and internal market | | X |
| | Horizon 2020 joint work programme on Key Enabling Technologies (KETs) | Industrial policy and internal market | | X |
| *ENV* | Review of the Thematic Strategy on air pollution and associated legislation | Environment | X | |
| | Review of Waste Policy and Legislation | Environment | X | |
| | Environmental climate and energy assessment framework to enable safe and secure unconventional hydrocarbon extraction | Environment | X | |
| | New climate and energy framework for the period up to 2030 | Environment, Energy | X | |
| | Legislative proposal on invasive species | Environment | | X |
| *ENV / JRC* | INSPIRE evolution and preparation for review of INSPIRE in 2014 | Environment | | X |
| *ESTAT* | Proposal for an amending Regulation on the European statistical programme 2013-2017 | Statistics | | X |
| *HOME* | Proposal for rules governing surveillance of external sea borders | Foreign and security policy | | X |

| DG | ACTIONS | POLICY AREA[5] | SOURCE | |
|---|---|---|---|---|
| | | | CWP | OTHER |
| *JRC* | Assessment of security of energy supply | Energy | | X |
| | Renewable energy resource maps | Energy | | X |
| | Life cycle studies on raw materials | Environment | | X |
| | Natural disaster alerting | Environment, External relations | | X |
| | Support to implementation of EU critical infrastructure package | Foreign and security policy | | X |
| | Land use modelling | Agriculture, Energy, Transport | | X |
| *MARE* | Proposal for a Regulation for the conservation of fishery resources through technical measures for the protection of marine organisms | Fisheries | X | |
| | Proposal for a Regulation amending Council Regulation (EC) Bo 1224/2009 establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy | Fisheries | | X |
| | White Paper on Integrating Maritime Surveillance: the Implementation of the Common Information Sharing Environment. | Environment, Foreign and Security Policy, Shipping | | X |
| *MARE / ENV* | Proposal for a Directive establishing a framework for maritime spatial planning and integrated coastal management | Environment | | X |
| *MARKT* | Common framework for the production of indices and benchmarks, in particular their governance and calculation | Economic and monetary policy | X | |
| | Commission Recommendation on the operation of SOLVIT | Freedom, security and justice | | X |
| | Green paper on the insurance of natural and man-made disasters | Environment, Economic policy | | |
| *MOVE* | A Blue Belt for a single market for maritime transport | Transport | X | |
| | Framework on the future EU ports' policy including a legislative proposal | Transport | X | |
| | Internal Road Market - Access to the road haulage market and access to occupation of road transport operator | Transport | X | |
| | Single European Sky package - Single Sky II plus | Transport | X | |
| | Community vessels traffic monitoring and information system | Transport | | X |
| | Harmonised computerised information and reservation system for rail transport (CIRSRT) | Transport | | X |
| | ITS Deployment guidelines | Transport | | X |
| | Legislative proposal for the deployment of the interoperable EU-wide eCall | Transport | | X |

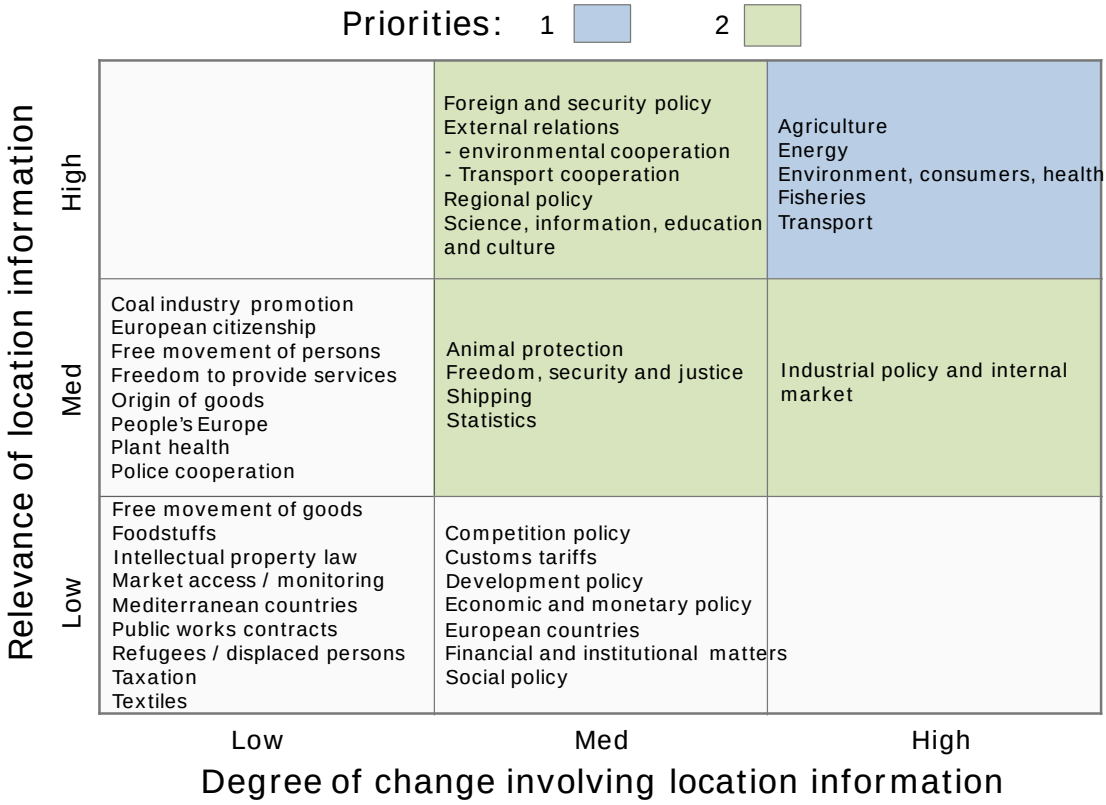
| DG | ACTIONS | POLICY AREA[5] | SOURCE | |
|---|---|---|---|---|
| | | | CWP | OTHER |
| | Implementation of the policy orientations on road safety 2011-20 | Transport | | X |
| | EU strategy for tackling serious road injuries | Transport | | X |
| | Legislative proposal on the EU Agency for Railways and repealing Regulation 881/2004 | Transport | | X |
| | Extension of the duration of SESAR Joint Undertaking - revision of the Regulation establishing the SESAR Joint Undertaking | Transport | | X |
| | Proposal for EU coordination in research and innovation in the rail sector | Transport | | X |
| | EU framework for Sustainable Urban Mobility Plans | Transport | | X |
| | Rail freight noise reduction | Transport, Environment | | X |
| *REGIO* | Danube Strategy first implementation report | Regional policy | | X |
| | Regulation on programmes co-financed by the Structural Funds and the Cohesion Fund | Regional policy | | X |
| *RTD* | Eurostars 2 | Industrial policy and internal market | | X |
| *SANCO* | New Regulation on animal health | Animal protection, Health protection | X | |
| | New Regulation on plant health | Health protection | | X |
| | Environmental monitoring of GMO cultivation | Health protection | | X |
| | Animal Disease Information System (ADIS) | Health protection | | X |
| *TAXUD* | EU risk management and supply chain security | Customs tariffs | | X |
| *Cross-cutting* | Preparing an EU position on the follow-up to Rio + 20 including the development of Sustainable Development Goals | External relations - environmental cooperation | X | |
| | State aid modernisation in key sectors | Competition policy | X | |
| | Review of standardisation acquis | Justice | X | |
| | Proposals for reinforced partnering in research and innovation under Horizon 2020 | Science | X | |

In summary, Figure 1 below maps the different policy areas in the Acquis according to the relevance of location information and the degree to which they are subject to changes in the short term involving location. From this diagram, it is possible to see the potential opportunities for EULF action.

From this analysis, it appears that the most fruitful domains where the EULF can potentially be of value are in thematic policies related to Transport, Environment,

Marine, Agriculture, Consumer Protection and Health, and Energy, as well as crosscutting policies on e-Government and Open Data. This includes space policy (Copernicus and Galileo), which is covered under Environment, Consumers and Health and Industrial Policy and Internal Market. Most of these policy areas are relatively mature in their use of location information and the EULF will be building on their experience and ongoing initiatives. However, attention also needs to be given to policy areas where there is less maturity in the use of location information.

***Figure 1 EULF Policy Priorities***




Some of the policy areas make reference to INSPIRE, for example the European Statistical Programme 2013-17 calls for alignment with INSPIRE and actions under the Intelligent Transport Systems Directive have recognised INSPIRE and recommended some extensions to the Transport Networks data specifications. However, there needs to be a much wider recognition of the benefits of a consistent and interoperable approach to publication and the potential to extend the INSPIRE approach on common data specifications to other sectors. Throughout the Assessment of the Conditions of the EULF, particular attention has been paid to the transport and mobility policy areas. Other policy areas that have received special attention are marine and agriculture.

## *2.2 Processes, products and services*

The implementation of policies mainly takes place through processes, in which policy is translated into practice. In the context of each policy area, several processes are running and each single public administration is involved in a huge number of processes. A process can be seen as a set of related activities which transform a certain input of resources (e.g. a (spatial) dataset, a register, statistical data) into an output of products or services (e.g. a decision, a completed assignment or an answer). These products or services are delivered to citizens, businesses or other administrations. Typical for the public sector is that processes are often similar in structure, as their outcome is typically determined by law. Moreover, many processes involve different organisations, at different administrative levels and/or in different thematic areas. Processes involve actions of and interactions among different organisations of the government as well as actors outside the government.

In other words, most processes consist of different – intra and inter-organisational – process steps and involve several interactions and exchanges between stakeholders. These interactions can be divided into Government-to-Citizens interactions (G2C), Government-to-Business interactions (G2B) and Government-to-Government interactions (G2G). Each of these interactions can take place at the start, end or during the process. For instance, a process can start with a G2C interaction (e.g. a request for a permission), involve a G2C interaction during the process (e.g. public consultations) or end with a G2C interaction (e.g. a granted permission).

In recent years, much attention has been paid to identify and describe the products, services and processes in the public sector. With a view to the identification of products and services, many public administrations started setting up a catalogue of their products and services. Such a catalogue provides an overview of all products and services that are provided by public administrations, and can be used in communicating with citizens and businesses.

In the e-Government domain, efforts have also been undertaken to identify key e-Government services. The EU e-Government Benchmark reports[6] make use of a selection of 20 basic services to assess the progress in the deployment of e-Government solutions in EU Member States. These 20 basic services include 12 services related to citizens and 8 services related to businesses. Citizen services are income taxes, job search services, social security benefits, unemployment benefits, personal documents, car registration, application for a building permission, declaration to the police, public libraries, (birth and marriage) certificates, enrolment in higher education, announcement of moving; and health-related services. Services related to businesses are social contribution for employees, corporate tax, VAT, registration of a new company, submission of data to statistical offices, customs declaration, environment-related permits and public procurement.

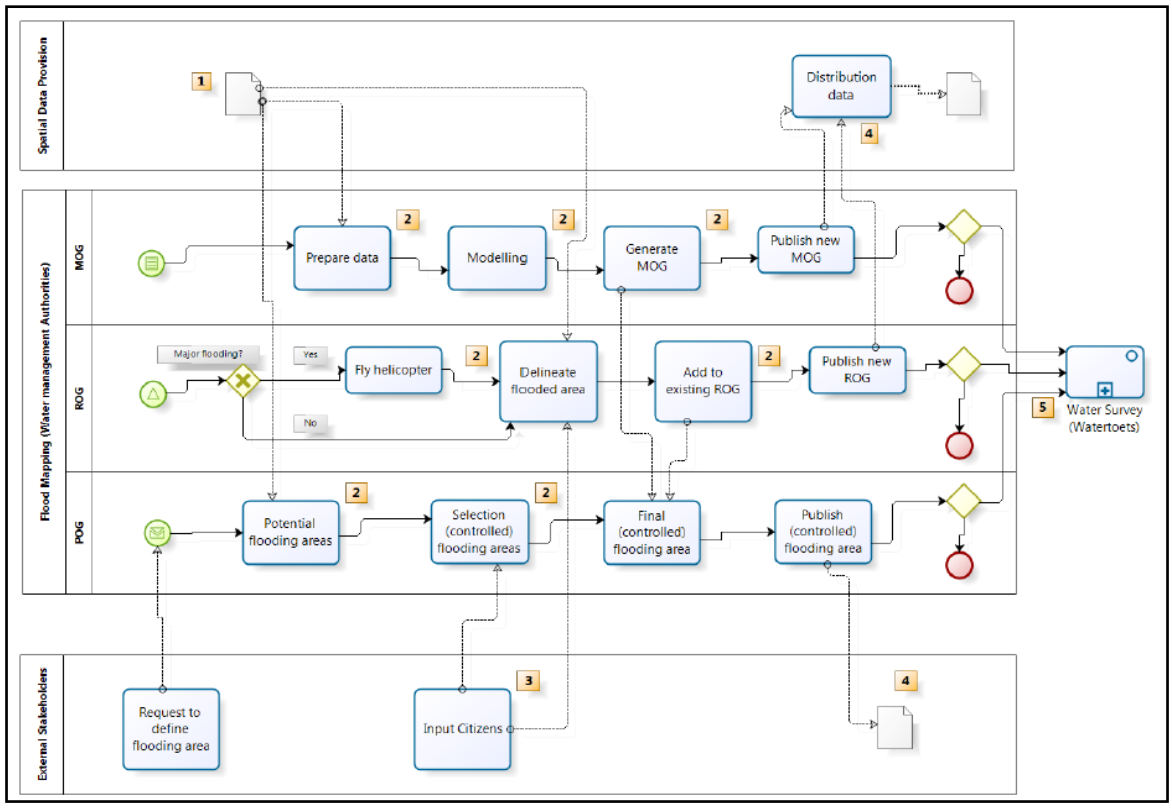
[6] http://ec.europa.eu/information_society/newsroom/cf/itemdetail.cfm?item_id=6537

These services can be grouped into four service clusters: (i) income generating, for government; (ii) registration (iii) service returns e.g. health, social, libraries; and (iv) permits and licences. Key characteristics of these basic services are the applicability in most EU Member States and their connection to 'life events', i.e. important stages in a citizen's life, such as school, marriage, or buying a property.

An examination of the 20 services shows that there are several processes in which the use of location information is essential, such as the application for building permissions, the granting of environment-related permits or the announcement of moving to another address by a citizen. In other processes, the potential contribution of location information is less prominent. However, most of the basic services and their underlying processes are in some way dealing with a location.

In addition to these so-called basic services processes, there are many public sector processes in which location information is fundamental to the entire process and relevant in most or even all process steps. This is the case, for instance, in the domains of environment, agriculture, spatial planning and transport. Here, the impact of location information in improving and optimising processes might be very high, because location information is fundamental to the entire process. The aim of the EULF should be to promote and stimulate the use and integration of location information in basic service processes as well as in processes with a strong geographical component.

***Figure 2 Process map of the flood mapping process in Flanders***



The identification of different processes in which location information can be used is just a first step. To gain additional knowledge on these processes, it is necessary to understand the entire process, i.e. the sequence of events and interactions between input and output. Process mapping or modelling tools can be used to describe a process at a high level of abstraction, providing insight in the different process steps, the actors involved but also the use of location data and technology.

As an example, Figure 2 provides a process schema of the flood mapping process in Flanders which consists of three main parts resulting in three different flood maps (Modelled Flood Areas - MOG, Recently Flood Areas - ROG and Potential Flood Areas or buffer areas - POG).

This chapter provided a first exploration of the use and the potential use of location information for government. The chapter demonstrated how the use and the relevance of location information should be assessed at different levels. The highest level is the level of the - broader - *policy area*. Each policy area deals with several *policy themes*, which are addressed through different types of *policy actions*. The actions determine or influence the *processes* in which the implementation of policies actually takes place. Throughout these processes, *products and services* are provided to citizens, businesses and other administrations.

Table 4 demonstrates this multi-level logic with examples in two policy areas. Although the examples provided in this table refer to EU policy, the same logic can be applied at Member State level. This multi-level policy analysis will be taken into account in the assessment approach which is explained in more detail in chapter 3.

***Table 4 Multi-level analysis of policies***

| POLICY AREA: | TRANSPORT | CONSUMERS |
|---|---|---|
| **Policy theme** | Intelligent transport systems (ITS) | Animal health |
| **Policy actions (Directives, Action Plans, R&D, Regulations, Decisions, …)** | Directive 2010/40/EU on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport<br><br>and<br><br>Action Plan for the Deployment of Intelligent Transport Systems in Europe | Council Regulation No 1/2005 on the protection of animals during transport and related operations<br><br>and<br><br>Animal Health Strategy for the European Union (2007-2013) |
| **Process** | Traffic management | Monitoring of animal transport |
| **Product / service** | Multimodal journey planners | Online registration of journey |

# 3. Assessment approach

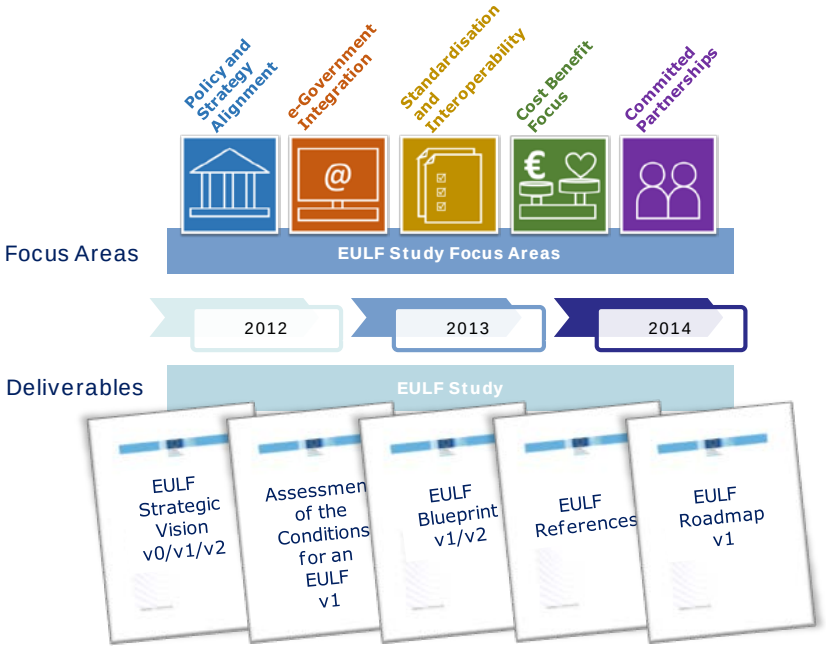
## 3.1 Context of the assessment

The 'Assessment of the conditions for an EULF' is the second of the key deliverables of the EULF project. Other key deliverables are the EULF Strategic Vision, the EULF Blueprint and the EULF Roadmap.

- The '**EULF Strategic Vision**' provides a shared vision and rationale for a European Union Location Framework, defines its scope, and highlights the key implementation steps and governance for its creation and ongoing operation.
- The '**EULF Assessment of the conditions for an EULF**' provides an assessment of the state of play in the different focus areas of the EULF and the need for EULF action in these areas.
- The '**EULF Blueprint**' contains methodologies, recommendations, guidelines and best practices in the five focus areas.
- The '**EULF References**' provides inventories, links and supplementary information related to the other EULF documents.
- The **'EULF Roadmap'** will consist of a high level implementation plan for the EULF.

Figure 3 provides an overview of the 5 deliverables of the EULF and the 5 focus areas that will be addressed in the first phase of the project.

***Figure 3 EULF deliverables and focus areas***



### *3.2 General approach*

The assessment was carried out in different stages and is based on several information gathering activities with Member States and Commission DGs. During the assessment, a multiple level approach was followed:

- EU Policy level – analysis of several policy domains at the European level and the actions taken in these policy domains
- MS Policy level – analysis of policies and strategies with regard to e-Government and INSPIRE/NSDI implementation
- Case level – analysis of the use and integration of location in processes, within one single policy domain or cross-sectoral, within one country or cross-border.

For collecting the necessary information, different methods were applied in order to capture a maximum of information and to maximise interaction with stakeholders. Four methods can be distinguished:

- Desktop study analysing existing material (e.g. documents, websites): EU policies, strategies, legislation and communication, e-Government and INSPIRE/NSDI implementation documents, technical documents, etc.
- Survey targeting the INSPIRE and e-Government communities in Member States: providing a general overview of the state of play and a more structured answer on particular questions;
- Interviews and focused consultations providing a better insight into specific cases (good practices) with each case covering one or different aspects of the EULF;
- Interactive workshops and meetings to discuss with stakeholders particular topics of the EULF, providing feedback on key elements of the analysis and the vision, promoting best practice cases, etc.

### *3.3 Assessment activities*

The first in the series of activities was to develop an inventory and analysis of existing documents, websites, etc. For example, all e-Government strategies and related activities can be found on the web; many repositories exist which could be screened for best practices (e.g. e-Government awards at European and national levels); also INSPIRE practices have been documented extensively. The EULF team started from this wealth of information and screened, structured and analysed the information.

The next key stage of the assessment was the design and implementation of the EULF 'Survey on use and integration of location information within e-Government'. The main objective of this survey was to collect information on the current integration and use of location data in e-Government in EU Member States. The survey also aimed to get insight in the initiatives and actions taken at Member

State level to support and facilitate the integration of location data in e-Government.

The survey questionnaire was developed by the KU Leuven in close consultation with the EC Joint Research Centre (JRC), Institute for Environment and Sustainability (IES) Digital Earth and Reference Data (DE) Unit. A preliminary version of the survey was tested through interviews with different INSPIRE national contact points during the INSPIRE Conference 2013. Based on the results of these test interviews, the survey was modified. The questionnaire was set-up to gather not only descriptive information on the current situation in each Member State, but also to collect information on good practices, relevant documents, tools and standards. A combination of structured and open-ended questions was used to provide a good mix of different types of information. If the information requested in this survey was available in other documents, respondents were asked to provide references where possible.

The survey consisted of four parts. The first part focused on the extent to which location information is used and integrated in different public sector processes and public service delivery in the respondents' country. The second part focused on the observed benefits of wider and better use of location information. The third part contained questions regarding initiatives and actions taken in respondents' country to support and realise the integration of location in e-government. The survey ended with a general assessment of both the barriers to and enablers of integrating location in e-Government.

The survey was targeted at both the public authority officials responsible for e-Government (e.g. ISA Contact Points and e-Government coordinators) and those responsible for location information (e.g. INSPIRE National Contact Points) in each EU Member State. The survey was designed in such a manner that it could be completed by individuals from both communities. The aim was to collect information on the current status of the use and integration of location information in e-Government in each Member State from both perspectives: the perspective of the Geographic Information (GI) community and the perspective of the e-Government community. This approach also allowed us to measure the involvement in and knowledge of the use of location information in e-Government in both communities, and stimulated the involvement of both communities in the development of the EULF. 23 countries responded to the EULF survey between September and the beginning of November 2013 (see Table 5).

The survey provided much valuable information on the actions taken at Member State level (part 3 of the survey) to facilitate and coordinate the integration of location information in e-Government. Actions that were addressed in the survey were the development of strategies, the establishment of coordination, the implementation of data policies and the application of standardisation approaches. Respondents were not only asked to indicate whether actions in these domains were implemented in their country, but also to refer to documents in which these actions are described. In addition to the documents provided by the respondents, relevant information on the implementation of INSPIRE and national spatial data

infrastructures (NSDI), on e-Government and on the integration of location information in e-Government was collected by the project team. The analysis of these documents provided insight in how both the EU and Member States are taking care of the integration of location information in e-Government through actions in different areas.

***Table 5 Countries that replied to the EULF survey***

| 12 responses from GI/INSPIRE representatives |
|---|
| Croatia (HR), Czech Republic (CZ), Estonia (EE), Finland (FI), France (FR), Latvia (LV), Poland (PL), Republic of Macedonia (MK), Slovenia (SI), Sweden (SE), Switzerland (CH), United Kingdom (UK) |
| **7 responses from e-gov/ISA representatives** |
| Belgium (BE), Cyprus (CY), Hungary (HU), Italy (IT), Ireland (IE), Slovakia (SK), Spain (ES) |
| **4 'joint' responses** |
| Denmark (DK), Germany (DE), Lithuania (LT), Netherlands (NL) |

A third phase in the data collection and analysis was the in-depth analysis of the use and integration of location information in different processes. The aim of this analysis was to identify actions and initiatives to support and facilitate the use and integration of location information in the context of specific public sector processes. These processes include processes within one policy domain as well as cross-sectoral processes, and processes within one country as well as cross-border processes. While the survey helped to identify interesting processes in different Member States, some processes were selected by the EULF team. Each of these processes were described and analysed in a similar way using a standard template (factsheet), addressing the five focus areas of the EULF: the alignment of strategies, the integration in e-government, standardisation and interoperability, partnerships and different types of benefits. In that way, insight was gained in the efforts and actions that are taken at process level with regard to the five focus areas to achieve the integration of location information in e-government.

Finally, the results of the different activities were presented, discussed and validated at several work meetings and workshops.

# 4. E-government integration

*The integration of location information and services and of INSPIRE components in an e-Government context is a necessary condition for realising the full potential of location information. This chapter discusses the current level of integration of location information and services in public sector processes in Member States and the different models of integrating location information in e-Government. Throughout this chapter, several best practices are highlighted of how location information has been successfully integrated in e-government.*

## *4.1 Integration of Location Information and Services in e-Government processes*

In the context of their national e-Government programme and activities, Member States and their authorities have placed a lot of emphasis on the online delivery of services to businesses and citizens. Member States' policies and activities in the domain of GI, on the other hand, are strongly focused on the development of national spatial data infrastructure (NSDI) and the implementation of INSPIRE. SDIs support the use and exchange of spatial information in public sector processes, enabling governments to deliver services to citizens and businesses. Therefore, it is absolutely essential to understand and consider these public sector processes when developing SDIs and providing location e-services.

Public administrations can make use of location information for many purposes and in the context of different public sector processes. The degree to which (digital) location information is used and integrated in these processes, can be different and several levels of integration can be distinguished. A high level of integration of location information in public sector processes means that the use of this information is integrated in most or even all process steps, including the interactions with citizens, business and other administrations. Where location information is integrated in only some of the process steps and in other process steps location information is not used or only used in support of the process, the level of integration can be considered lower. Location information can also be used without being integrated in the actual process. In some processes, location information may only be used in support of the entire process, but completely separate from the administrative process, e.g. by a separate GIS unit or in separate applications.

Based on the answers and results of the EULF survey, a first assessment can be made of how location information currently is used and integrated in public sector processes in the different EU Member States. Based on a selection of 10 public sector processes, including processes linked to basic services as well as processes with a strong geographical component, respondents were asked to indicate to what extent location information was integrated in these processes. It is interesting to notice how many Member States consider the integration of location information in several processes as high, especially in processes with a strong geographical

component. In processes such as maintenance of addresses, registration of real property and design of spatial zoning plans, the use of location information was described as 'strongly integrated' in many Member States. Registration of real property and maintenance of address information can be considered as basic services to citizens and businesses, in which location information can be valuable throughout the entire process. In most other 'basic service' processes, such as registration of citizens and new companies, taxation of citizens and management of patients' health records, the current use and integration of location information seems to be significantly lower. In some Member States, location information is strongly integrated in the processes of issuing environmental permits, granting building permissions and planning public transport. However, there are also several Member States that only use location information in support of these processes or where location information is integrated in only some of the process steps.

***Table 6 Level of integration of location information in different processes***

| LOW INTEGRATION | MEDIUM INTEGRATION | HIGH INTEGRATION |
|---|---|---|
| Registration of citizens | Planning of public transport | Maintenance of addresses |
| Registration of companies | Building permissions | Registration of real property |
| Taxation of citizens | Environment-related permits | Design of spatial zoning plans |
| Management of patient's health records | | |

Member States were also asked to report other public sector processes in which digital location information in their country was strongly integrated in the process. Examples of processes that were mentioned by Member States are heritage protection, management and provision of statistical information, public order and safety processes, management of protected areas, processes in the domain of agricultural policy, meteorological processes and several others. However, some Member States indicated that good examples of the integration of location information in processes are still scarce. It was also interesting to notice how several Member States referred to certain databases or to thematic geoportals.

The EULF survey also collected information on the use of location information in the delivery of services to citizens and businesses. Based on a list of 10 services, all making use of location information (5 services to citizens, 5 to businesses), Member States were asked to indicate which of these services were available in their country and at which level these services are provided (national, regional, local or as single best practice). Typical examples of services that already exist at national level are online access to real property information, multimodal trip planners, applications for parcel-based subsidies and registration of recent natural hazard events. Services that are mainly provided at the local level are tools for supporting citizens' e-participation in public consultation, applications to find and

explore available industrial and/or commercial sites and also multimodal trip planners.

***Table 7 Location information services in EU Member States***

| 'Location information' services at national level | # MS |
|---|---|
| Online access to real property data | 18 |
| Applications for parcel-based subsidies | 11 |
| Multimodal trip planner | 10 |
| Online registration of new companies | 8 |
| Registration of natural hazard events | 7 |
| **'Location information' services at regional or local level** | **# MS** |
| Multimodal trip planner | 12 |
| Applications to explore available industrial and/or commercial sites | 6 |
| Tools for supporting citizens' e-participation in public consultation | 6 |
| Map-based job search services | 4 |
| Interactive map of doctors and healthcare providers | 4 |

In addition, Member States also had the opportunity to add other services provided to citizens or businesses. Interesting examples are: reporting ecological problems, online access to cadastral information, citizens' events maps, and portals for water management facilities. Also several examples of cross-border services were provided by the Member States, such as applications for the management and protection of international rivers, and applications to manage the deployment of emergency services.

A selection of public sector processes were analysed to provide additional insight on how location information was integrated in different process steps and in the interactions between governments, citizens and businesses. The integration of location information and services with other types of information and services seems to be a necessary condition for realising the full potential of location information in public sector processes and creating benefits for public authorities, citizens and businesses.

An important step towards the integration of location information in processes is the identification, description and analysis of all relevant processes, and how (location and non-location) information is accessed, used, managed and shared throughout these processes. This enables the identification of common process steps for participating organisations, and also bottlenecks in the access to, use of and exchange of information.

***Good practice***

***LoG-IN (Germany, UK and Belgium)***

***Integrating location in economic policy***

The LoG-IN project turned local authorities into key players in the local economy through the development of a Generic Information Infrastructure. This infrastructure allows them to manage and publish their own - location - data and to build their own web applications. One of the first applications built with support of this Generic Information Infrastructure was the so-called 'Local Business Guide', an online overview of all companies in a certain region, based on the authentic register of enterprises.

One of the success factors of the LoG-IN project was the linking of administrative and location data, and the integration of location data in several governmental activities in the domain of economic policy. The Local Business Guide is used by municipal authorities to communicate with the businesses in their region. In combination with other location data, the map of companies is also used by public servants and politicians to shape the local economic policy. The Local Business Guide is open to citizens and business as well. Citizens can make use of the Guide to find out where certain types of businesses are located. Businesses can provide citizens with additional information on their products and activities.

Several of the practices that were examined clearly demonstrate the need to integrate administrative and location information from different sources, and also to make this information easily available throughout the process to different parties (politicians, public servants, citizens, businesses), following a multi-channel approach. In many cases, specific solutions are used for different target groups (e.g. web services, mobile applications, web applications, integration in national portal etc.).

***Good practice***

***Integration of location in emergency services***

***Universal Map Module (Poland)***

In 2012, the Head Office of Geodesy and Cartography (GUGIK) in Poland developed the Universal Map Module (UMM) as a geospatial component enhancing the Command Support System of Polish emergency services. UMM is applicable for all the emergency services that can be integrated in their Command Support Systems and delivers "spatial functionality" to support their business processes.

A key strength of the UMM is the integration of location information in the support systems of emergency, fire, policy and medical services. Also important is the development of a common set of application tools for different types of users. On top of the UMM services, four different applications are built: a desktop application for analysing 2D and 3D data, a web application for visualisation, a web application for daily control activities, and also a mobile client.

Several Member States and regions have recognised the importance of following a process perspective in developing the spatial data infrastructure and integrating location information in e-Government. The Dutch location information strategy GIDEON literally states that *"the use of geo-information by public authorities should be integrated in their work processes and their services to the public and businesses"*. In Germany, modelling of public sector processes is used to derive the real demand for a national spatial data infrastructure. Analyses of how different components and functionalities are used in specific processes helps to further develop these components in order to meet the needs and requirements of actual users. Also the benefits of developing and implementing SDIs are assessed by looking into real business cases. A similar initiative was undertaken in the United Kingdom, were workshops with representatives from different sectors helped generate a better understanding of the needs and demands of different types of users.

***Good MS practice***

***Identification of location information processes (Flanders – Belgium)***

An important initiative in stimulating the use of location information in e-Government in Flanders, was the organisation of a series of workshops with representatives from organisations in different policy domains. The aim of these workshops was to identify applications for improving service delivery to citizens and businesses, where location information can provide an important contribution. The study revealed that most of the (potential) applications required only a limited amount of functionality, such as geo-visualisation, geo-localisation, routing and access to some reference data sets, and a large number of these applications could be realised by the development of a small number of components.

## *4.2 Models of integrating location in e-Government in the Member States*

Member States may follow different approaches to facilitate the integration of location information in e-Government. These approaches can include actions on several fronts: strategies, organisation and coordination, and data policies. This section analyses the experiences and actions of European Member States.

All European Member States have some kind of e-Government strategy or programme. Of the countries examined in our assessment, four Member States reported that the national e-Government strategy does not include any reference to location information. All other e-Government strategies in some way deal with the use of location information. However, in many cases, the reference to location information is relatively limited. For instance, the e-Government strategic document of the Republic of Macedonia only refers to the national geo-portal and several search and evaluation services. The Lithuanian e-Government strategy contains several indirect references to location information, but location information is not included in the objectives or actions of the plan.

***Table 8 Reference to location information in MS e-Government strategies***

| LOCATION INFORMATION IN E-GOVERNMENT STRATEGY | # MS |
|---|---|
| e-Gov strategy with reference to location information | 18 |
| No reference to location information in strategy | 4 |
| No answer/ don't know | 1 |

However, in several national e-Government strategies, a more prominent position has been given to location information. The national e-Government strategy of Germany explicitly states that available, up-to-date and area-wide reference data are essential for location-based e-Government and therefore, spatial data services need to be integrated into e-Government applications. The Dutch government-wide implementation agenda for e-Government services sees location information as an important subset of the basic registrations of the country. According to the e-Government strategy of Switzerland, geodata should be made available for general use to the authorities of the Confederation, the cantons and communes, the private sector, the public and to academic and scientific institutions in a sustainable, up-to-date, rapid and easy manner, in the required quality and at a reasonable cost. In Denmark, shared core data for all authorities, including location data, is one of the twelve focus areas of the national e-Government strategy. This focus area reflects the strategic objective to integrate location information in e-Government at all administrative levels.

***Good MS practice***

***'eGovernment 2012-2015' (Ireland)***

The Irish 'eGovernment 2012 – 2015' policy document sets out a vision for e-Government and the actions required to make that vision a reality. E-Government 2012 – 2015 identifies 45 actions for the period until end-2015, grouped under eight key priority areas. 'Digital Mapping and Geographic Information Systems' is considered as one of the key priority areas, because knowing "when and where" things happen is important in many aspects of public policy. Under this priority area, four actions are proposed:

- Public bodies will evaluate the potential for exploiting digital mapping and GIS technologies in ways that are affordable, sustainable and of relevance to the customer bases of their services, taking into account the personal or commercial sensitivities of the data.
- Public bodies will identify data sets they hold that contain location based data and will make these details available to other public bodies where appropriate
- The Public Service CIO Council will work with relevant Public Bodies to progress the development of a location identifier to help improve service delivery.
- Public Bodies will seek to extract maximum benefit from Post Codes when these are introduced.

In Finland, the national e-government strategy states that the use of location data and information will improve the quality of services and decision-making and will make public administration more efficient. Therefore, the terms and conditions for governing location data should be clear and harmonised and widely used in the public sector. According to the Swedish e-government strategy, the structured management of location information is an essential requirement in developing e-services in society. The Swedish public sector must use location information that is described in nationally determined references based on international agreements.

In their approach to location information, many Member States have embraced INSPIRE and taken the opportunity to define a strategic government location framework. In the EULF survey, three countries indicated not to have a specific strategy document regarding the use of location information in e-Government. In all other Member States a strategy dealing with location information in e-Government was developed. While in one Member State only the technological issues were addressed in the strategic document, the strategy of three other Member States only covered organisational issues. However, the majority of the Member States reported that they have a strategy dealing with both organisational and technological issues.

***Table 9 Location information strategies in Member States***

| LOCATION INFORMATION STRATEGY | # MS |
|---|---|
| Yes, on organisational and technological issues | 14 |
| Yes, but only on organisational issues | 3 |
| Yes, but only on technological issues | 1 |
| No | 3 |
| No answer/ don't know | 2 |

There are however important differences between these strategies with regard to their content and their focus on the issue of integrating location information in e-Government. For instance, many national location information strategies strongly focus on the development of the national spatial data infrastructure and the implementation of different necessary components, and hardly any attention is paid to the actual integration and use of location information in an e-Government context. Moreover, several Member States consider the transposition of INSPIRE into national law or to other laws about the implementation of INSPIRE and/or e-Government as a strategic document. But some Member States have developed a strategy that clearly recognises the significance of location information for realising the objectives of e-Government and that defines requirements and actions for a better understanding and wider use of location information. Interesting examples of location information strategies dealing with the role of location information in e-Government can be found in the Netherlands, the United Kingdom and Sweden.

A key challenge of the Dutch location information strategy was to further develop a geo-information facility in order to give location information a prominent place within e-services and e-Government. Existing key information facilities, that were created to improve services, enforcement, policy preparation and all other processes in government, strongly focused on the creation, management and use of personal data. This observation is also made in the context of the UK Location Strategy, stating that most data in the public sector are related to two aspects: the identification of individuals and companies ('who') and the location of communities, assets, events or environmental conditions ('where'). While the importance of identity information is widely recognised, location information is often overlooked. As many areas of policy and service delivery require information on both issues, the UK Location Strategy wants to *"complement the focus already being given to 'who' by introducing a separate parallel focus on 'where'"*. According to the Swedish SDI strategy, the national spatial data infrastructure should support the development of Swedish e-governance, the Swedish business community and international competitiveness. Improved access to geodata is considered as a precondition for expanded e-governance. The strategy states that INSPIRE is fully in line with the national e-Government activities, as the ambition is to make available all relevant information about society, and not just with regard to the environment. This should result in a more efficient administration and a range of new e-services to citizens and businesses.

***Good MS practice***

***National Spatial Data Strategy 2010-2015 (Finland)***

The Finnish national spatial data strategy, 'Location: the Unifying Factor', for 2010–2015 is strongly oriented towards the utilisation of spatial data. One of the four objectives put forward in the strategy is that "*the spatial data infrastructure will improve the quality of life and the quality of processes carried out in society at large*". By 2015, spatial data services should support people in their everyday activities and during their leisure time, spatial data should be widely used in decision making, it will support the participation of citizens, and should be used for managing a large number of functions essential for society.

Also the experiences of Germany and Finland can be considered as good practices with regard to the integration of location information in e-Government at strategic level. In Germany, the integration between the national e-Government strategy and the location information strategy happens at the level of the objectives, as both strategies share the same goals/key objectives: orientation and benefits to citizens, cost-effectiveness and efficiency, transparency, data protection and data security, social participation, future viability and sustainability. Finland is a good example of the shift in focus of the location information strategy and activities from data production and availability to the actual use and integration of location information in e-Government.

Another important dimension in Member States' approaches towards the integration of location information in e-Government is related to the issues of organisation and

coordination. In the EULF survey, only one of the Member States examined indicated their approach for integrating location information in e-Government suffered from a lack of leadership. The other Member States have different approaches with regard to the organisation(s) responsible for stimulating the integration. Three main groups of Member States can be distinguished: Member States where the lead is taken by the authority responsible for the Geospatial Information (GI) policy, Member States where the national or regional e-Government organisation is taking leadership and Member States where leadership is exercised by both the GI and the e-Government organisation(s).

***Table 10 Organisation taking leadership in integrating location information in e-Government in Member States***

| ORGANISATION TAKING LEADERSHIP | # MS |
|---|---|
| GI organisation or body | 11 |
| E-government organisation or body | 4 |
| Both organisations | 6 |
| Lack of leadership | 1 |
| No answer/ don't know | 1 |

Most of the Member States belong to the first category, and can be described as 'GI-driven' Member States. In almost half of the examined Member States, it is the organisation or body responsible for GI that takes leadership in the integration of location information in e-Government. Four Member States belong to the second group, as in those countries leadership is provided by the national e-Government body or ministry. In six of the examined Member States leadership in integrating location information in e-Government is a shared responsibility of the GI and e-Government body.

***Table 11 Coordination structure where e-Government and GI representatives meet***

| COORDINATION STRUCTURE | # MS |
|---|---|
| Yes | 20 |
| No | 2 |
| No answer/ don't know | 1 |

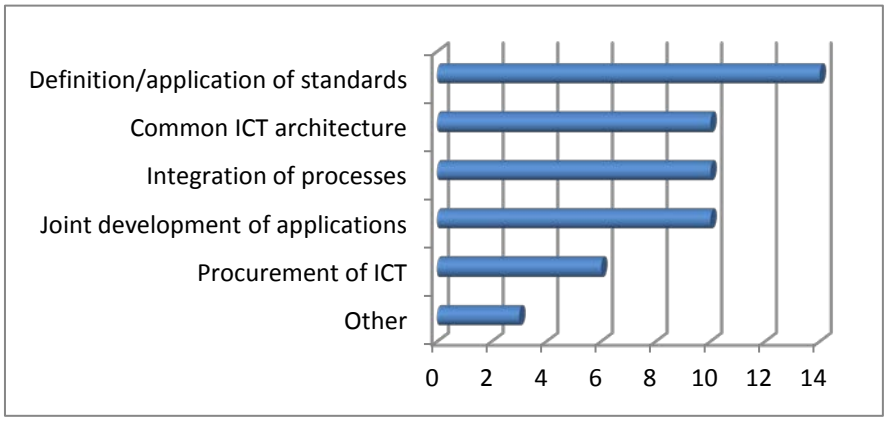
Another important organisational aspect of the integration of location information in e-government is the establishment of a coordination structure or body in which members of the e-Government community and members of the location information community (or GI community) meet each other. Table 11 shows that only two Member States indicated not to have a coordination structure or body. In almost all of the Member States that were examined, a coordination structure or

body is in place where the e-Government community and the location information community meet each other. There are however significant differences in the composition, the role and the tasks of these coordination bodies, which are expected to have an impact on the actual contribution of these bodies to the integration of location information in e-government.

In most Member States, consultation and cooperation between representatives of the e-Government community and representatives of the GI community takes place in the coordination structure of body that was established to implement the NSDI and/or INSPIRE. In some Member States, consultation and cooperation is organised in e-Government coordination bodies or groups. In other Member States, there is a clear link between the coordination structure for e-Government and the coordination structure for GI/SDI. For instance, in Ireland there is a spatial information sub group under the Government Offices of the Chief Information Officer. In Sweden, many of the members of the Geodata advisory board are also members of the e-Government Delegation.

In Germany, the e-Government community and the location information community are both represented in the Steering Committee GDI-DE, the coordination and decision-making body for the development of the national SDI. The Steering Committee GDI-DE has been assigned to the IT Planning Council, which constitutes the Central Steering for the Information Technology of the federal and Länder (states) governments. Both bodies, the SC GDI-DE and the IT Planning Council, consist of representatives from federal, provincial and municipal governments. In Switzerland and Germany, joint meetings are regularly organised between representatives of both communities, in addition to consultation and coordination in existing bodies.

***Figure 4 Areas of collaboration between e-Government and GI sector***




In the EULF survey information was also collected on the areas in which there is some form of coordination or collaboration between the e-Government sector and the location information sector. Figure 4 shows that the main area in which national e-Government and GI responsible parties cooperate is the definition and application of standards. In 14 of the 23 Member States, the e-Government sector and the location information sector work together in defining and applying standards.

Collaboration and coordination between the GI and the e-Government responsible parties also takes place with regard to the establishment of a common ICT architecture (10) joint development of applications (10) integration of processes (10) and procurement of ICT (6).

A third domain in which location information can be considered as a part of e-Government is in the definition and execution of a data policy. Although the data policy of Member States consists of many relevant issues, the EULF survey focused on two key issues: the presence of an integrated data policy and the presence of a single access point for all data.

***Table 12 Presence of integrated data policy at Member State level***

| DATA POLICY | # MS |
|---|---|
| Open data policy for all data | 4 |
| Integrated data policy for all data | 4 |
| Integrated data policy for location data | 4 |
| Common policy for several datasets | 6 |
| Each dataset has its own policy | 5 |

The survey demonstrated that many of Member States do not have one common data policy for all their data. From the 23 Member States that are included in the study, 5 Member States indicated that separate policies existed for each dataset in their country. In 6 Member States there already is a common policy for multiple datasets, but this policy is limited to only some datasets. While some Member States already have an integrated data policy for all location data, other Member States even have an integrated data policy for all their data, both location and non-location data. In 4 of the examined Member States an open data policy for all data is in place.

Another relevant aspect of the data policy of Member States that might stimulate the use and integration of location information is the implementation of a single access point for data. Such a central access point provides users access to all data sets and services, but also all the relevant information for access and use. Although most Member States have at least one access point where several data sets are made accessible, in many Member States this access point only provides access to a selection of location data. In Germany and Poland, all INSPIRE-thematic data are accessible through one single access point, in Switzerland, the Czech Republic and Sweden also non-INSPIRE data are made accessible through this access point. Three Member States (Estonia, the United Kingdom and Slovakia) reported to have a single access point for all data, location as well as non-location data. In the Netherlands, a single access point is under development.

***Table 13 Presence of single access point at Member State level***

| SINGLE ACCESS POINT FOR DATA | # MS |
|---|---|
| Yes, for all data | 4 |
| Yes, but only for spatial data | 8 |
| Yes, but only for non-spatial data | 5 |
| No | 6 |

***Good MS practice***

***Data.gov.uk (UK)***

The UK has pressed ahead in publishing open data and has set up a single government website (data.gov.uk) to make government data available for public consultation. The UK Location Programme used data.gov.uk as its 'geoportal', enabling users to discover and access geospatial and other data through a single access point. So far, data.gov.uk contains over 6000 datasets, with over 1000 of these datasets published by the geospatial community. Users are able to discover and view INSPIRE and other geospatial data in data.gov.uk, using the capabilities developed by the UK Location Programme. The Programme has also built upon various open source software components to create an INSPIRE reference platform for publishers.

### *4.3 Assessment*

With regard to the integration of location information in e-Government the following key observations can be made:

1. *In none of the European Member States surveyed is location information fully integrated in e-Government* ***in the sense that integration is achieved at the strategic level, at the organisational level and at the level of the data policy at the same time.*** *It should however be noticed that several Member States are successful in integrating location information at least at two of these levels.*
2. In many Member States, leadership in stimulating and facilitating the use and integration of location information in governmental processes and activities is taken by the national GI body or organisation, and **the involvement of the organisation(s) responsible for e-Government is limited.** Coordination on the use of location information also mainly takes place in the context of the NSDI/INSPIRE council or the NSDI/INSPIRE coordination structure.
3. At the strategic level, **most national e-Government strategies refer to location information, but only in very general terms**. Most Member States have developed a NSDI or location information strategy, but often

the focus is on data production and typical SDI components (and not on the actual use of location data)

4. With regard to data policy, several Member States have developed an integrated data policy for location and non-location data, and some Member States also have a single access point for both data. However, **in many Member States, each dataset still has its own data policy and only a relatively small number of existing datasets are accessible through one unique access point.**

5. **Registration of real property and maintenance of address information are two basic services to citizens and businesses, in which location information is already integrated throughout the entire process.** In most other 'basic service' processes, such as registration of citizens and new companies, taxation of citizens and the management of patients' health records, the current use and integration of location information seems to be significantly lower.

6. **Typical examples of location information services to citizens and businesses** at national level are online access to real property information, multimodal trip planners, applications for parcel-based subsidies and applications for registering recent natural hazard events. Services that are mainly provided at the local level are tools for supporting citizens' e-participation in public consultation, applications to find and explore available industrial and/or commercial sites and also multi-modal trip planners.

Good practices of the integration of location information into e-Government take into account the following three lessons:

1. **Member States can follow different approaches to facilitate the integration of location information in e-Government**. However, a successful approach should include actions on several fronts: actions to integrate location information in e-Government should be taken at strategic level, at organisational level and at the level of data policies.

2. **It is essential to understand and consider public sector processes when developing SDIs**, which in fact support the use and exchange of location information in these processes, but also when providing e-services, which often are the end result of a broader process composed of many G2G, G2B and G2C interactions.

3. EU institutions and Member States should take actions not only to facilitate and stimulate the further integration of location information in processes with a strong geographical component, but especially **to stimulate the use and integration in key e-Government processes in which integration of location information is less obvious.**

# 5. Policy and strategy alignment

*To avoid inefficiencies and contradictions between different policies and legislation, alignment of the reference to location information in different policy areas is necessary. This chapter first provides an analysis of the references to different policy areas in the INSPIRE data specifications. Next, the chapter demonstrates the need for actions for improved alignment in procurement as well as the need for policy and strategy alignment in the area of Transport policy. and Finally, the chapter analyses different actions for improved alignment at Member States level. Throughout the chapter, several best practices are presented of realising alignment between relevant policies and strategies.*

## *5.1 References to policy areas in INSPIRE data specifications*

Many of the INSPIRE data specifications make reference to the policies which they support. The most frequent references are shown in Table 14, which specifies those policies which are referenced two or more times. As would be expected, most of the references are to environmental policy, with the Water Framework Directive receiving most of the references. The Water Framework Directive (2000/60/EC) has a strong relationship with spatial data and also for environmental monitoring and reporting. Specific online resources have been made available for this policy (that also encompasses other water policies) through the Water Information System for Europe (WISE).

All of the most popular themes are not related purely to the environment and, only agricultural and aquaculture facilities can be seen as belonging to a defined sector covering at least two main food production activities. The remainder relate to cross-cutting activities. The theme with the most policy references is the area management / restriction / regulation zones and reporting units theme, understandable in view of its general scope. The population distribution - demography theme covers ways in which pressure on resources can be assessed in terms of populations. This includes policies for workers as well as statistics for businesses and social conditions. A range of other policies are referenced in the utility and government services theme, with a focus on waste and soil issues. Production and industrial facilities also had several references, with pollution as a particular concern. Policy choices relating to Transport networks may have a large environmental (as well as social and economic) impact, including policy on Community guidelines for the development of the trans-European transport network (Decision No 884/2004/EC, Regulation L228, 09/09/1996) and more recent developments through Trans-European Networks: Toward an integrated approach (COM(2007) 135 final Brussels, 21.3.2007 SEC(2007) 374). Specific reference is made to transport in the Environmental Impact Assessment Directive (85/337/EEC), which is relevant for data to support cross-border environmental impact assessment activities.

***Table 14 Policy References in INSPIRE Data Specifications***

| | References | Area mgmt / restriction / regulation zones and | Agricultural and aquaculture facilities | Utility and governmental services | Population distribution - demography | Protected sites | Soil | Human health and safety | Buildings | Habitats and biotopes | Production and industrial facilities | Species distribution | Transport networks | Statistical units | Bio-geographical regions | Energy resources | Sea regions | Natural Risk Zones | Mineral Resources | Administrative units | Hydrography | Geology | Land Use |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Water Framework Directive (2000/60/EC) | 9 | 1 | 1 | 1 | | 1 | 1 | 1 | | | | | | | | | 1 | | | | 1 | 1 | |
| Habitats Directive (EEC/92/43) | 5 | 1 | | | | 1 | | | | 1 | | 1 | | | 1 | | | | | | | | |
| Marine Strategy Framework Directive (2008/56/EC) | 3 | 1 | | | | | | | | 1 | | | | | | | 1 | | | | | | |
| CAFE Directive (2008/50/EC) | 3 | 1 | | | | | | 1 | 1 | | | | | | | | | | | | | | |
| Noise Directive (2002/49/EC) | 3 | 1 | | | | | | 1 | 1 | | | | | | | | | | | | | | |
| Waste Directive (2008/98/EC) | 3 | 1 | 1 | 1 | | | | | | | | | | | | | | | | | | | |
| IPPC Directive (2008/1/EC) | 3 | 1 | | 1 | | | | | | | 1 | | | | | | | | | | | | |
| E-PRTR Regulation 166/2006 | 3 | | 1 | 1 | | | | | | | 1 | | | | | | | | | | | | |
| NUTS Regulation 1059/2003 | 3 | | | | 1 | | | | | | | | | 1 | | | | | | 1 | | | |
| NACE Regulation 1893/2006 | 3 | | 1 | | 1 | | | | | | 1 | | | | | | | | | | | | |
| Birds Directive 2009/147/EC | 2 | 1 | | | | 1 | | | | | | | | | | | | | | | | | |
| Natura2000 Standard Data form. EUR 15 Version | 2 | | | | | 1 | | | | 1 | | | | | | | | | | | | | |
| Soil Directive (proposed) | 2 | | | | | | 1 | | 1 | | | | | | | | | | | | | | |
| Council Directive 91/271/EEC - urban waste-water treatment | 2 | 1 | | 1 | | | | | | | | | | | | | | | | | | | |
| Floods Directive (2007/60/EC) | 2 | 1 | | | | | | | 1 | | | | | | | | | | | | | | |
| Seveso II 2003/105/EC Directive | 2 | | 1 | | | | | | | | 1 | | | | | | | | | | | | |
| Industrial emissions Directive 2010/75/EU | 2 | | 1 | | | | | | | | 1 | | | | | | | | | | | | |
| Nitrates Directive 91/676/EEC | 2 | 1 | | | | | 1 | | | | | | | | | | | | | | | | |
| Promotion of energy from renewable resources Directive | 2 | | | | | | 1 | | | | | | | | | 1 | | | | | | | |
| Landfill and waste 1999/31/EC | 2 | | | 1 | | | 1 | | | | | | | | | | | | | | | | |
| Waste mgmt from extractive industries Directive | 2 | | | 1 | | | | | | | | | | | | | | | 1 | | | | |
| Population and housing censuses Regulation 763/2008 | 2 | | | | 1 | | | | 1 | | | | | | | | | | | | | | |
| NUTS Regulation 105/2007 | 2 | | | | 1 | | | | | | | | | 1 | | | | | | | | | |
| NUTS Regulation 31/2011 | 2 | | | | 1 | | | | | | | | | 1 | | | | | | | | | |
| European TENs Decision No 884/2004/EC | 2 | 1 | | | | | | | | | | | 1 | | | | | | | | | | |
| EIA Directive (85/337/EEC) | 2 | | | | | | | | | | | 1 | 1 | | | | | | | | | | |
| Bern Convention | 2 | | | | | | | | | | | 1 | | | 1 | | | | | | | | |
| OSPAR Convention | 2 | 1 | | | | 1 | | | | | | | | | | | | | | | | | |
| HELCOM Convention | 2 | 1 | | | | 1 | | | | | | | | | | | | | | | | | |
| Barcelona Convention | 2 | 1 | | | | 1 | | | | | | | | | | | | | | | | | |
| Other policies with only one reference | 77 | 15 | 17 | 10 | 8 | 2 | 4 | 5 | 2 | 3 | | 2 | 2 | | 1 | 2 | | 2 | 1 | | | | 1 |
| References | 155 | 30 | 23 | 17 | 13 | 9 | 9 | 8 | 7 | 6 | 5 | 5 | 4 | 3 | 3 | 3 | 2 | 2 | 2 | 1 | 1 | 1 | 1 |

Statistical units are particularly important from a crosscutting perspective, and relevant for many policy areas such as agriculture and regional policy. The data specification makes reference to the NUTS Regulation (EC No 1059/2003) as well as two amendments (REGULATION (EC) No. 105/2007 and REGULATION (EC) No. 31/2011). It is likely that many of the statistics gathered in different policy areas either directly relate to certain zones (e.g. for a given policy) or are reported for

certain areas, in terms of national level comparisons or sub-national statistical units such as varying nomenclature of territorial units for statistics (NUTS) levels. Geographical reporting is also important when making comparisons or cross-references between different policy domains.

### *5.2 Identification of actions for improvement alignment in procurement*

One specific area in which alignment could be improved is procurement at European and national level. The way reference is made to INSPIRE and/or to location information (e.g; collection, use) in procurement is very variable. It is often very vague, without reference to the key-documents and sometimes defining requirements that are even (partially) contradictory to INSPIRE requirements. In the context of this study, information about procurement was gathered for 19 examples covering different sectors: e.g. the development of components of Spatial Data Infrastructures, the implementation of particular systems for thematic policies, etc. In some cases reference is made to INSPIRE, but in very general terms. Sometimes more particular references are included, referring to the requirement of applying specific standards, or to the use of certain tools. In other cases, even no reference is made at all. In those cases, requirements are formulated to define new data models or to collect existing data without making use of INSPIRE components. Some examples of references to INSPIRE and geospatial standards are given in Table 15.

***Table 15 Examples of references to INSPIRE and geospatial standards in European and national procurement***

| PROCUREMENT | REFERENCE TO INSPIRE/GEOSPATIAL STANDARDS |
|---|---|
| Mapping of ecosystems and their services in the EU and its Member States, DG ENV | "Quality of the deliverables, compliant to INSPIRE provisions … The results of the contract will be … produced according to INSPIRE regulations and guidance documents“ |
| Procurement of Consultancy Services - Foundation Spatial Database, Cape Verde | “Creating an electronic template for filling metadata, enabling the standardisation of the existing and future cartographic documentation, complying with the Inspire directive and ISO 19115/TS19139.” |
| EUCORES - European Coal resources, DG ENER | “A geographical database and map of EU coal basins should be developed including potential sources of coal bed methane based on a harmonised typology”<br><br>No reference to INSPIRE |

The EULF aims to contribute to an improved alignment of procurement documents by developing guidelines on how to refer to INSPIRE, location information and location based services and geospatial standards. This could be in the form of a document similar to the “Guide for procurement of standards-based ICT – Elements of Good Practice” (European Commission, 2013). This might include general

recommendations in the form of “What to do” and “What not to do”, as well as sample texts for referring to the INSPIRE Directive, its Implementing Rules and Guidelines and technical documentation. Also the way reference should be made to geospatial standards could be described, e.g. by examples.

### *5.3 Need for policy and strategy alignment: the example of the area of Transport*

The analysis of policy areas and actions in chapter 2 of this document highlighted transport as one of the policy areas where there are good opportunities to achieve better alignment with the INSPIRE Directive and to improve the use of location information.

EU Transport Policy focuses on five specific modes of transport (air, road, rail, maritime and inland waterways) and addresses a wide range of a of inter-modal transport issues: passenger rights, security and safety, transport infrastructure, clean and sustainable transport, intelligent transport systems, etc. Location Information and interoperability is essential for each of these issues (see chapter 6 for in depth discussion on interoperability). All modes of transport require location information. Roads construction, route planning, vehicle tracking and incident management all involve location information as well. Location information is playing an increasing role in road and rail with the introduction of multi-modal route-planning, the growth of mobile services involving transport information, and the move towards Intelligent Transport Systems.

The importance of information and information technology is clearly reflected in the ‘White Paper 2011 - Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system’[7], which holds a series of 40 concrete initiatives for the next decade to build a competitive transport system that will preserve mobility, remove major barriers in key areas and fuel growth and employment. Many of these initiatives are dealing with the collection, management, use, integration and exchange of information for different modes of transport and for different issues (safety information, travel information, traffic information, etc.). In general, it is argued that a better and especially more integrated use of information and information systems should increase the efficiency of transport and of infrastructure.

To optimise the capacity and the use of the European transport infrastructure, intelligent and interoperable technologies are considered to be essential: Intelligent Transport systems to support road transport and equivalent systems for other modes of transport (SESAR, ERTMS, RIS, SafeSeaNet), while the next generation of multimodal transport management and information systems require interoperable and interconnected solutions. There is a clear need for alignment between the policies and strategies related to these intelligent technologies and infrastructure, and INSPIRE.

[7] http://ec.europa.eu/transport/themes/strategies/2011_white_paper_en.htm

While INSPIRE definitely provides interesting opportunities to *railway administrations*[8], railways need to comply with many other EU initiatives (ERMTS, but also the Register of Infrastructure, the European Rail Freight Corridors, …) which all require data exchange according to their own specifications. Alignment between these initiatives is needed to avoid many time-consuming data conversions from national formats to numerous international data formats.

With regard to *air traffic information*, the Single European Sky (SES) legislative framework, supplemented by the Single European Sky ATM Research (SESAR) programme, aims to increase the overall performance of the Air Traffic Management system in Europe. In this context, the SESAR programme has been leveraging INSPIRE. SESAR contributed to the drafting of the (Air) Transport Network theme, with the aim of harmonising the INSPIRE theme and the existing ATM specific specification (the Aeronautical Information Exchange Model (AIXM)) as much as possible. SESAR also used the output of INSPIRE to develop its own work: not only the technical aspects but also legal aspects of INSPIRE were taken into account. A 'Study on the legal aspects of ATM services' (European Organisation for the Safety of Air Navigation, 2012[9]) was performed, considering INSPIRE as an example of what actions can be taken in terms of public-private partnership, PSI, IPRs, licensing, funding and pricing policy. Currently, the ATM and INSPIRE communities still work in parallel, although further alignment and coordination between both communities would provide additional benefits.

The relevance of location information for the development of these intelligent technologies is especially recognised in the domain of ITS to support *road transport*. The 'Intelligent Transport Systems in action' document[10] of the European Commission, which discusses the Action Plan and legal framework for the deployment of intelligent transport systems in Europe, sees intelligent digital maps as a basic requirement for a whole range of ITS tools. One of the actions towards the optimal use of road traffic and travel data deals with the availability of accurate public data for digital maps (Action 1.3.). A key problem is that road data that are needed to produce these intelligent digital maps are not always available, accurate or reliable, with a lack of rules for timely updates. This hinders Europe-wide interoperability and the development of advanced ITS technologies. To solve this problem, the EC started with an assessment of the state-of-the-art concerning road-data collection for digital maps, and of the technical and standardisation needs, in which the INSPIRE Directive was also taken into account.

An important initiative in this context is the European ROSATTE project that aimed to establish an efficient and quality ensured data supply chain from public authorities to commercial map providers with regards to safety related road content. Up-to-date safety attributes are needed by road authorities but also for Advanced Driver Assistance Systems (ADAS). In order to achieve the ITS Directive

[8] http://www.poweredbyinspire.eu//documents/Powered_by_Inspire-2.pdf
[9] http://www.eurocontrol.int/sites/default/files/content/documents/information-management/study_on_the_legal_aspects_of_atm_services_and_the_possibl.pdf
[10] http://ec.europa.eu/transport/media/publications/index_en.htm

Action 1.3 "Accurate Public Data for Digital Maps" the ROSATTE project recommended ROSATTE and INSPIRE to work together in order to create a TN-ITS specification. The expected added value of a harmonised framework using the results of ROSATTE adapted to the INSPIRE spatial data infrastructure will likely have a direct impact on both public and private sectors. In other words, alignment between the INSPIRE and ITS Directive is desirable, although there certainly are differences between both.

The idea of improved alignment between INSPIRE and the ITS Directive was further developed in the Digital Maps Working Group of the iMobility Forum (September 2011 – May 2013) and the EU-funded eMaPS support project (running in parallel in the same period), and led to the establishment of the "Transport Network ITS Spatial Data Deployment Platform"[11], bringing together public ITS spatial data providers (road authorities) and ITS spatial data users (map makers, application developers, …). In this context, an investigation was carried out of the organisational and legal issues to align ROSATTE with the INSPIRE Directive (Rapp Trans, 2013[12]). Based on the comparison of legislative and organisational aspects of INSPIRE and ROSATTE, and the state-of-play of INSPIRE and ROSATTE, a number of alignment options were presented and assessed. The assessment of different alignment options was based on four criteria: the most suitable option was the option that 1) suits the needs of the ITS community, road authorities and map providers, 2) provides optimum harmonisation and interoperability, and re-use of existing services and infrastructures, 3) minimises effort and costs of implementation and 4) has limited risks for acceptance and realisation, and can be deployed on the short to medium term.

With regard to the technical and organisational alignment, the following scenario was selected as the most suitable: No changes are made to INSPIRE specifications, only changes to TN-ITS (ROSATTE) specifications that can be achieved with limited effort. The harmonised ROSATTE specifications are treated as a non-mandatory extension within INSPIRE. The extension is coordinated by the TN-ITS platform. TN-ITS specifications can in a later stage be integrated in INSPIRE-TN. A download service for full downloads can be provided by Member States but is not mandatory. Member States are free to decide whether services are published on a national TN-ITS or INSPIRE portal, but all services are published on the EU TN-ITS portal. The feedback loop is implemented as developed and tested by ROSATTE and adoption of the ROSATTE feedback method in INSPIRE is promoted.

With regard to the legal alignment, three options for the legal alignment of TN-ITS and INSPIRE were identified and analysed:

- Option 1: EC adopts, as a delegated act in terms of the ITS Directive, the harmonised ROSATTE specifications to address the compatibility, interoperability and continuity of ITS-related road map data. The delegated act specifies that such data are to be included in the INSPIRE infrastructure.

[11] http://tn-its.eu/
[12] http://tn-its.eu/wp-content/uploads/2013/11/eMaPS-D2.44-RappTrans-INSPIRE-org-legal-alignment-v01-130508.pdf

- Option 2: The harmonised ROSATTE specifications are treated as non-mandatory extensions within INSPIRE. The extensions are coordinated by the TN-ITS platform.
- Option 3: The harmonised ROSATTE specifications are to become part of the INSPIRE specifications, in sync with the expected major update cycles of INSPIRE.

Based on the advantages and drawbacks of each option, a recommendation was made to request the EC to adopt the harmonised ROSATTE specifications through a delegated act under the ITS Directive, but meanwhile, start the implementation with committed parties on the basis of a non-mandatory extension on INSPIRE TN specifications.

### *5.4 Improved alignment at Member State level*

An important step in the alignment of policies involves the identification of all relevant policies that somehow involve location information. While Chapter 2 provides an assessment of relevant policies at EU level, several Member States have undertaken a similar assessment for themselves. A key section of the NSDI Strategy of Croatia includes the identification and analysis of all national and European policies that are dealing with the production, use and exchange of location information. The strategy not only includes an overview of the relevant laws, regulations and policy declarations in each policy area, but also an assessment of the importance of location information in each area. The Dutch GIDEON policy document, which describes the implementation approach and strategy for the development of the national spatial data infrastructure between 2008 and 2011, demonstrates the political and administrative relevance of geo-information by linking the (potential) use of this type of information to the coalition agreement of the national government. In the GIDEON policy document, it is argued that location information plays a major role in the realisation of the different pillars in this agreement, like a sustainable living environment, an innovative, competitive and enterprising economy, a service-minded public sector and in the promotion of social cohesion.

An interesting approach for improving alignment between policies at Member State level is the establishment of base registers or key registers. Base registers can be defined as trusted authentic sources of information under the control of an appointed public administration or an organisation appointed by government. Authentic means that the source is considered to be the source of information which represents the correct status and which is kept constantly up-to-date and of highest possible quality.

Many Member States consider the establishment of a common set of authentic data or reference data essential for realising the integration of location information in many domains. Reference data enable the integration of different types of information, including data from various sources and thematic areas. The establishment of a common set of location datasets also contributes to the efficient

and cost-effective sharing of information with location attributes across the public sector and with third parties. The recognition of a dataset as reference data is part of an official procedure, in which the requirements and responsibilities related to the structure, quality and accessibility of the data are laid down. The contribution of base registers to the alignment of policies is especially high in cases where the compulsory use of these registers by public authorities is required.

***Table 16 Establishment of authentic registers at Member State level***

| AUTHENTIC REGISTERS OF LOCATION DATA | # MS |
|---|---|
| Yes, in place | 11 |
| Yes, in development | 3 |
| No | 9 |

Several Member States have one or more spatial data registers as part of a broad set of authentic registers. The Dutch government started in 2000 with the development of the concept of a system of key registers. The Netherlands now has four geo-registers in place: topographical data, cadastral data, address data and buildings data. Two key geo-registers, the large-scale standard map of the Netherlands and the subsurface key register, are planned to be put in place soon. These six geo-registers are part of a system of 13 key registers. In the Slovak Republic, the Spatial Information Register is one of the four basic registers. The Czech Republic has one register of Territorial Identification, Addresses and Real Estate, which represents one of the four base registers in the Czech Republic. In Croatia, a register of addresses and a cadastral register are currently in development. In some federal states and municipalities in Germany the real estate cadastre data is online accessible and legally binding. Also Lithuania, the Republic of Macedonia and Slovenia have one or more key registers of location information.

***Good MS practice***

***Good Basic Data for Everyone (Denmark)***

Denmark has an ambitious strategy to set up core registers, including location registers for geography, road and real estate, and properties, housing, buildings and addresses. The intentions of the strategy are explained in the “Good Basic Data for Everyone” document. The Danish basic data programme is part of the e-Government strategy. Basic data have to conform to several requirements: basic data needs to be as correct, complete and up-to-date as possible; all public authorities must use public sector basic data; as far as possible, basic data must be made freely available to businesses as well as the public; and basic data must be distributed efficiently, accommodating the needs of users. Moreover, all data have to be conform to the same technical requirements, in order to make it possible to link data. A common infrastructure is established to ensure the stable and efficient distribution of data. The coordination of the development and use of basic data is realised through the establishment of a cross-institutional Basic Data Committee.

The in-depth analysis of processes that were successful in integrating location information demonstrates how the alignment of different policies and legislation is also necessary at process level for realising the integration of location information in e-government. Government processes are defined, governed and/or affected by many different policies and pieces of legislation. There are particular cross-sectoral laws and agreements that organise the exchange and use of information – location and non-location- information by public bodies, citizens and business. Besides this cross-sectoral legislation, several policies and regulations to stimulate and organise the use and sharing of information relate to information in specific policy domains or thematic areas. In some cases, several policies and legislation include rules on *which* information needs to be collected, managed and used, *how* this information should be collected, managed and used, and *who* is responsible for collecting, and managing and using information.

***Good practice***

***Digital Exchange platform for spatial plans (the Netherlands)***

***Alignment of relevant policies***

During the period 2003-2010 the former ministry of Housing, Spatial Planning and the Environment worked together with other public partners such as the Kadaster, Association of Dutch Provinces and the Association of Dutch Municipalities to implement a digitised environment for spatial planning. In this context, nationwide applicable open standards were developed, the so-called RO standards.

An important initiative towards the alignment of policies was the introduction of the new Spatial Planning Act. According to this new Act, municipalities, provinces and national administrations are obliged since 1 January 2010 to digitise their spatial plans and make them available as Open Data. The Act also allocates the associated tasks for public authorities at different administrative levels. There was also an obligation to apply the RO standards, through a ministerial regulation on spatial planning standardisation.

A key step for realising alignment between policies is the preparation of common definitions and standards, and harmonised procedures. When agreement is reached on these definitions, standards and procedures, it is often necessary to adapt existing legislation and/or to prepare specific legislation to regulate the data collection, management and use and the roles of different actors. Especially in the case of multisectoral processes and cross-border processes, the challenge of realising policy alignment is often complicated, as many different policies and regulations need to be taken into account.

***Good practice***

***IDOS – Cross-border journey planner for citizens (Czech Republic)***

***Alignment of data collection***

IDOS, a multimodal public transport planner of the Czech Republic, integrates international, national, regional and urban public transport connections including bus, rail and air. Any person can access the service online to obtain information on a planned journey including timetables, links to the reservation systems, information about the connection (e.g. time, distance, transfer-time). The service is location enabled: the traveller can select origin and destination on a map and view the travel route.

During the development of this multimodal public transport planner, significant efforts were made to align the information gathering activities of different public transport operators. To regulate the data collection process and the roles of the different process owners, specific legalisation was prepared. Also cooperation, data interchange and service agreements were set-up, to align the activities of all parties involved.

### *5.5 Assessment*

With regard to the alignment of policies and legislation at EU and Member State levels dealing with location information, the following three key observations can be made:

1. Although some of the EU policy areas, such as the European Statistical Programme 2013-17 and the actions under the Intelligent Transport Systems Directive, make reference to INSPIRE, this is not the case in many other policy areas. **A much wider recognition of the benefits of a consistent and interoperable approach and the potential to extend the INSPIRE approach to other sectors is still needed.** In this context, a general reference to INSPIRE is not enough, legal and strategic initiatives should define in more detail how alignment can/should be achieved from the legal, organisational and technological perspective.
2. Also **the way reference is made to INSPIRE and/or to location information in procurement is very variable**. It is often very vague, without reference to the key-documents and sometimes defining requirements that are even (partially) contradictory to INSPIRE requirements. In some cases reference is made to INSPIRE, but in very general terms. In other cases, even no reference is made at all and requirements are formulated to define new data models or to collect existing data without making use of INSPIRE components.
3. A necessary step for policy and strategy alignment at Member State level is **the identification of policies dealing with the production, use and exchange of location information**. Agreement should be found on common procedures, definitions and standards between different policies and legislation.

Good practices of the alignment of policies and legislation dealing with location information take into account the following three lessons:

1. **Improved alignment should be realised in thematic policies that are relatively mature in their use of location information**. These include policies related to Transport, Environment, Marine, Agriculture, Consumer Protection and Health, and Energy, as well as crosscutting policies on e-Government and Open Data. However, attention also needs to be given to policy areas where there is less maturity in the use of location information.
2. In line with existing guidelines for the procurement of standards-based ICT, similar **guidelines on how to refer to INSPIRE, location information and location based services and geospatial standards should be developed**, and should be adopted by EU and Member States' institutions when conducting a procurement process.
3. At Member State level, a successful approach for improving alignment between policies is **the establishment of base registers or key registers and the compulsory use of these registers by public authorities**. The contribution of key geo-registers to the alignment of policies especially is high in case these geo-registries are part of a broader set of key registers in e-Government.

# 6. Standardisation and interoperability

*Standardisation is one of the conditions to reach semantic and technical interoperability of systems and services that support e-Governmental processes. This chapter discusses some standardisation and interoperability initiatives for SDIs, e-Government and thematic sectors, and how these initiatives need to be cooperate with each other. The standardisation awareness and efforts in Member States is discussed and the status of implementation in the context of e-Government is assessed. Throughout this chapter, several good practices are highlighted of how standardisation can be integrated in SDI and general ICT strategies, and how standards help to reach interoperability in practice.*

## *6.1 Standards for SDIs and e-Government*

One of the key conditions to achieve full integration of location information in e-Government is the improvement of interoperability between systems, data, and the people that use them. The European Interoperability Framework (EIF) defines interoperability as *"the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems"* (European Commission, 2010). So interoperability should be seen in a broader context, comprising political, legal, organisational, semantic and technological aspects. Semantic and technological interoperability can be achieved by standardisation. Standards are documents *"established by consensus and approved by a recognised body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context"* (ISO and IEC, 2004). Standardisation activities take place everywhere, through many standardisation bodies, but also through legal initiatives such as INSPIRE. Standardisation activities of the ICT and e-Government communities, as well as the GI- and related thematic communities are relevant in the context of the EULF.

It is of utmost importance that all these standardisation activities are streamlined. While many of the initiatives already build upon each others' work and take into account each others' standards, it is crucial to bring the communities together and to align the respective standardisation efforts. Table 17 gives some examples of major standardisation and interoperability platforms and frameworks for some key policy areas. Many more exist, but we discuss these briefly to illustrate the challenges in reaching the above mentioned standards alignment. Throughout the INSPIRE initiative, considerable efforts were made in this direction. The EULF will help to work on this further through the development of recommendations, guidelines and the collection of best practices.

The major overarching EU initiative regarding interoperability and standardisation efforts is the *ISA programme*. The programme has already developed a European

Interoperability Strategy (EIS), Framework (EIF) and Architecture (EIA) that help Member States to develop a national approach and guides them in their ICT implementation. Various actions have been defined to reach the goals of the ISA programme. Several of those actions are very relevant for INSPIRE and the improved integration of location information in e-Government. Some of the actions focus on the semantic aspects of interoperability. The Core vocabularies on person, business, public service and location are simplified, re-usable, generic and extensible data models that capture the fundamental characteristics of data entities in a context-neutral fashion. The vocabulary on location has been established with the help of the GI-community and efforts have been made to map the vocabulary to the INSPIRE specifications and national implementations (e.g. the INSPIRE theme addresses and the BeST and CRAB standard of Belgium/Flanders). The Asset Description Metadata Schema (ADMS) aims at describing semantic assets and standards. It follows a federated approach and is a useful way to describe the assets of INSPIRE as well. Many of the other activities, such as the establishment of base registries and the catalogue of services are also applicable in the INSPIRE context. The ISA programme works closely with standardisation bodies such as W3C and OASIS in which the e-Government communities are organised in specific working groups. According to OGC the cooperation between the GI and e-Government community could be further improved.

***Table 17 Examples of interoperability initiatives in different policy areas***

| POLICY AREA | ACTIVITIES | STANDARDISATION COMMUNITIES INVOLVED |
|---|---|---|
| ISA programme | Core vocabularies: person, business, public service, location<br>Asset Description Metadata Schema (ADMS)<br>Access to base registries, Catalogue of services | DG DIGIT and ISA community<br>W3C (e-Gov Interest Group)<br>OASIS (e-Government TC and SC) |
| Integrated Marine Policy (IMP) | Common Information Sharing Environment for the surveillance of the EU maritime domain (CISE) | DG MARE<br>OGC (Hydrography DWG; Met & Ocean DWG)<br>International Hydrographic Organisation (IHO) |
| Nature and biodiversity policy | Natura 2000 programme<br>Global Biodiversity Information Facility (GBIF) | DG ENV<br>GBIF community – intergovernmental bodies |
| Multi-modal transport and ITS | Transport Networks and ITS (TN-ITS) | DG MOVE<br>TN-ITS WG2 on Specifications and Standardisation<br>CEN/TC 278 (WG 7)<br>ISO/TC 211 and ISO/TC 204 (WG 3) |

Good examples of thematic areas in which interoperability efforts are made are nature and biodiversity, marine policy and transport and mobility policy.

The *Common Information Sharing Environment for the surveillance of the EU maritime domain (CISE)* is under development by DG MARE and is one of the actions under the ISA programme. CISE aims to improve interoperable and trusted cross-sector and cross-border data exchange between public administrations across seven policy areas: maritime safety and security, marine environment and pollution, fisheries control, border control, law enforcement, customs and defence. Several standardisation activities take place in the context of e.g. OGC (Domain Working Groups on Hydrography and Metéo/Oceans) and of the International Hydrographic Organisation (IHO). The latter has developed a series of specific standards for the development and maintenance of Digital Nautical Charts, the exchange of Digital Hydrographic Data (S-57), data quality, etc. At the time of writing this report, specific efforts were undertaken to bring together the different standardisation stakeholders in order to know and learn from each other and to seek a common approach for CISE.

In the context of the *nature and biodiversity* policy domain, the Natura 2000 (Habitat and Bird Directives) programme has developed a comprehensive data model and information system for monitoring biodiversity throughout Europe. The model has been taken into account during the development of the INSPIRE data specifications for the four related themes (protected sites, biogeographical regions, habitats and biotopes, and species distribution). However, there is a continuous need for improving the data model to host new requirements and reflect changed realities. This might entail the review of lists of habitats and species which must be reflected in revisions of the legislation. In this sense, the data model is dynamic and regular alignment with INSPIRE specifications might be needed. Also global efforts in this field such as the Global Biodiversity Information Facility (GBIF) might influence the standardisation efforts. GBIF is an intergovernmental initiative, and its members are countries, international organisations, …, collaborating to enhance free and open access to biodiversity data. The community relies on a technical infrastructure with its own Ecological Metadata Language (EML); its own data standard, i.e. the Darwin Core Archive (DwC-A) which is an internationally recognised biodiversity informatics data standard to simplify the publication of biodiversity data; a Global Registry of Biological Repositories; and a mechanism to handle unique identifiers. Since these activities are highly dynamic in nature, permanent alignment with the GI-community (and vice versa) is crucial.

The *Transport and Mobility Policy* area is a vast domain with themes such as Transport Infrastructure (TEN-T), sustainable transport, passenger rights, clean and urban transport and Intelligent Transport Systems (ITS). The policy is more and more multi-modal oriented and hence very complex in nature. The ITS Directive and Action Plan, and the Action Plan on Urban Mobility call for the promotion of and support to EU-wide multimodal travel information services. In this context, and more specifically in support of traffic management and transport planning processes, several standardisation efforts have been put in place over the past decade. Standards have been developed for describing public transport data models, while specific data exchange interfaces have been defined for the exchange of those data. Most of these standards have seen light under the CEN/TC 278

umbrella. An example of the efforts in semantic standardisation is Transmodel 5.1 (CEN/EN12896), a conceptual reference data model for use in information systems for public transport, including a dictionary of general semantics covering all modes of public transport. IFOPT (CEN/TS 00278207) is another semantic standard that defines a model for the main fixed objects related to public access to Public Transport (e.g. stop points, stop areas, stations, connection links, entrances, etc.). IFOPT defines four related sub models: a stop place model (mandatory), a POI model, an administrative area model and a gazetteer model (all three optional). The location based information of Public Transport objects is out of the scope of IFOPT. Also many data exchanges standards exist. To name just a few: SIRI (CEN/TS 00278181-1 to 5) which defines a service interface for real-time information relating to public transport operations. SIRI comprises a protocol for communication, supporting both direct request/response and publish/subscribe patterns of interaction. NeTEx is another CEN Technical Specification which is currently under development. It provides a physical data model based on XML for exchanging Public Transport data such as schedules. It is based on the Transmodel, IFOPS and SIRI specifications taking into account national standards such as TransXChange (UK), VDV 452 (DE) and Neptune (FR). Also ISO standards exist in the field. CEN/TC 278 and ISO/TC 204[13] are the two standardisation committees that develop most of the (intelligent) transport related standards.

Despite the fact that standardisation efforts in the domain of transport have existed for several years, many new standards see light and existing standards are being revised according to new requirements. Therefore there is a clear need for permanent alignment and cooperation with other sectors (in addition to alignment at the legal and organisational levels as described in section 5.1). Often, new requirements and potential solutions emerge through the application of standards in European projects. Examples are the ROSATTE (DG DIGIT) and eMaps (DG CNECT) projects that were mentioned before. Those projects are aiming at the establishment of an implementation platform for the exchange of Transport data between public authorities, map makers and other third parties[14]. This led to the set-up of the TN-ITS (Transport Network – Intelligent Transport Systems) Deployment Platform as a public-private partnership to improve the delivery of EU-wide real-time traffic and multi-modal travel information services. Two working groups take care of location-related aspects: WG1 on Location Referencing and WG2 on Specifications and Standards. One of the conclusions of the projects was the need to align the efforts in the transport sector with INSPIRE developments[15]. Therefore, a specific study was initiated to analyse the technical alignment between ROSATTE and INSPIRE specifications (complementing a study analysing the legal and organisational alignment). TN-ITS will take the INSPIRE data specifications

[13] ISO/TC 204 - Standardisation of information, communication and control systems in the field of urban and rural surface transportation, including intermodal and multimodal aspects thereof, traveller information, traffic management, public transport, commercial transport, emergency services and commercial services in the intelligent transport systems (ITS) field.

[14] With a focus on spatial reference data and road safety data.

[15] « The ROSATTE specification for coding road data is recommended as an extension to the INSPIRE Transport Network Specification (TN-ITS specification). »

methodology, its SOA based architecture and the existing specifications as a starting point. TN-ITS has already identified additional requirements (e.g. specific components such as pedestrian crossings) that are not covered by INSPIRE, as well as potential conflicting areas of implementation (e.g. the way of handling Identifiers). The collaborative approach is an example of good practice: transport and INSPIRE communities will work together in the different working groups, with a clear division of tasks and an joint approach that will align both worlds but at the same time respecting the particular aspects of both.

***Good practice***

***Multi-modal Journey Planners (Czech Republic, France, Italy, UK)***

***Services based on GI and transport standards***

Many multi-modal route planners exist in Europe. In 2012, the European Commission organised the 1st Smart Mobility Challenge inviting companies and individuals to present their multi-modal journey planners and ideas for improving mobility. Winners came from Italy (Trenitalia), France (SNCF), Germany (Penelope) and the Czech Republic (IDOS). But many other planners exist as well. Most of the journey planners rely on international and national transport standards such as the above mentioned Transmodel and IFOPT, and exchange standards such as SIRI, TransXChange, etc. A comparative analysis revealed that most of the projects in this field are aware of the standardisation challenges due to the fact that many stakeholders are involved, each owning part of the information required for making such planners work. The standardisation efforts seem to converge over the past few years: more and more national standards are now consolidated and replaced by international standards.

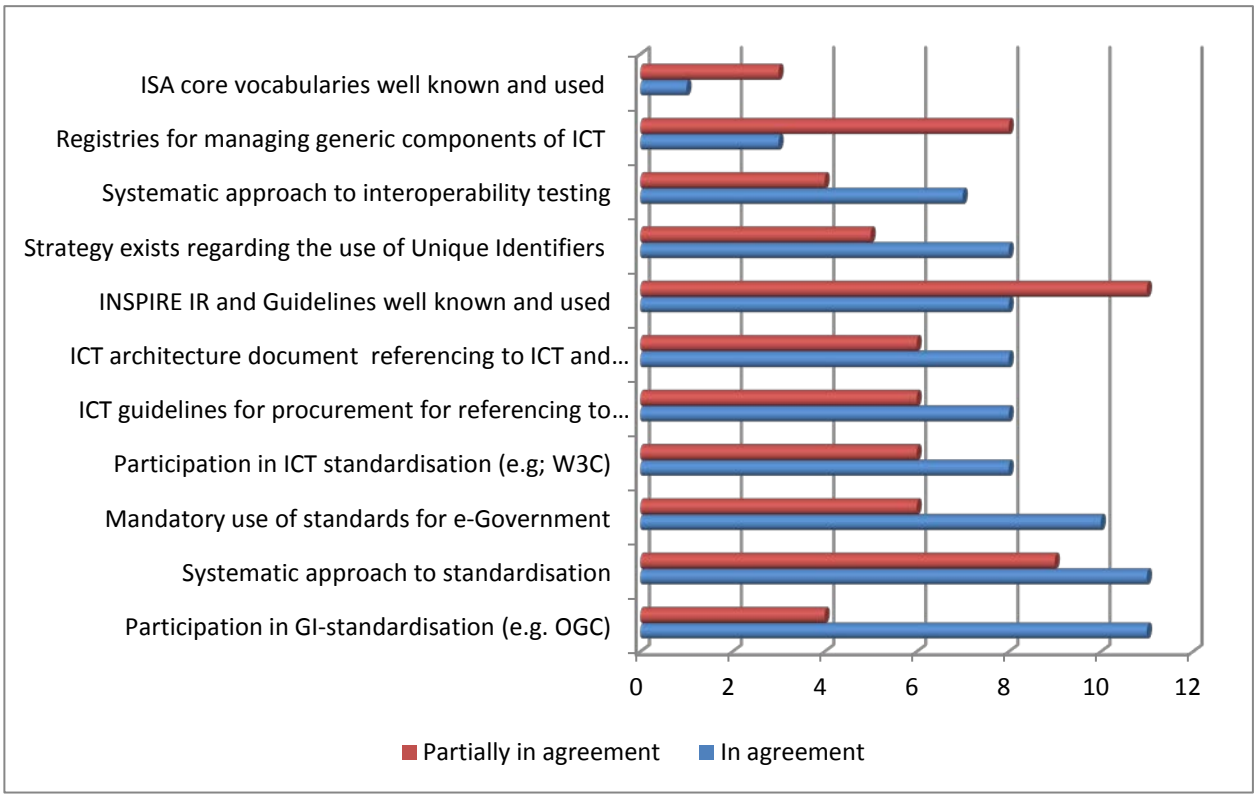
## *6.2 Status of implementation of standards and interoperability*

The implementation of standards in Member States was analysed using the results from the survey. One survey question was aiming to capture the knowledge, active participation and the efforts made in some key standardisation areas, including GI and general ICT standardisation. The results are shown in figure 4. Some Best Practices at country and process level also help us to better understand the standardisation efforts within particular countries. These cases reveal that generic ICT and GI-standards are more and more used in projects and particular business processes. More examples can be given and are described in fact sheets, illustrating this general trend.

Almost 90% of the countries state they have a more or less systematic approach regarding standardisation, including the application of GI-standards in e-Government. Most of these countries (8 of the 10) make it mandatory for public sector bodies to use international standards for e-Government solutions. This systematic approach can be seen in some countries that have developed very comprehensive architectural documents that guide their SDI and INSPIRE implementation. Although only 35% of the countries have an ICT architecture document referring to general ICT and GI-standards, some very interesting

examples can be found making the link between ICT, e-Government and SDIs. Germany has elaborated an *"Architektur der Geodateninfrastruktur Deutschland*[16]*"* (first version in 2007, update in 2010), while the Netherlands has elaborated a Framework for geo-standards[17].

***Figure 5 Standardisation efforts of Member States in the context of SDIs and e-Government***




In general terms, most countries that have a balanced approach for ICT- and GI-standardisation, and that have an elaborated ICT and/or SDI architecture, rely on an active participation in GI- and ICT standardisation bodies. While 11 countries are active in both types of standardisation organisations, 5 countries are not active in standardisation bodies at all. Of course this does not say necessarily much about the intensity or type of activities: countries might actively participate in the development of standards or rather focus on e.g. testing their implementation.

Although 8 countries state they have ICT-guidelines for procurement on how to refer to standards and specifications in most cases this refers to general guidelines for ICT procurement, or general principles of the application of open standards. No evidence could be found on specific procurement guidelines on how to refer to GI-

[16] http://www.geoportal.de/SharedDocs/Downloads/DE/GDI-DE/GDI-DE%20Architekturkonzeptv2.pdf?__blob=publicationFile

[17] http://www.geonovum.nl/onderwerpen/basisset-geo-standaarden/documenten/raamwerk-van-geo-standaarden-versie-22

standards or INSPIRE. Several Member States state that this is currently lacking but that such guidelines could be useful for them.

***Good MS practice***

***Framework for geo-standards (the Netherlands)***

Geonovum, the coordinating office for the SDI and INSPIRE in the Netherlands developed a first version of the document *"Raamwerk van geo-standaarden"* ("Framework of geo-standards") in 2007. New versions saw light in 2010 and 2012. The document is written for persons involved in the application of standards for spatial information: information managers, advisors, architects, IT providers, policy makers, etc. Based on the standards that are described in this framework, it is possible to build a solid spatial information infrastructure, adapted to international and national developments. The latest version of the framework is consistent with INSPIRE, ISO/TC 211 and OGC and takes into account developments in e-Government. Actual developments such as sensors, 3D visualisation and conformity testing are taken into account as well.
The document is unique in its sort and very useful for practitioners. It is very comprehensive and describes in a very structured way all the standardisation challenges that are at stake when implementing SDIs and INSPIRE, and when linking those infrastructures to e-Government initiatives (in case of the Netherlands this is NORA). The relationship between SDI and e-Government developments is made explicit and visible through the integrated architecture diagrams. The document illustrates very well that: 1) INSPIRE and e-Government are complementary infrastructures that can be integrated because of a common Service Oriented Architecture approach, 2) both deliver components that have a big potential for re-use and 3) both rely on international and often similar standards.

It is striking that despite the fact that in 16 of the 23 responding countries the GI-community was involved in formulating the answers to the questionnaire, only 8 countries estimate their knowledge on the INSPIRE implementing rules as very good and that those rules are actively being used; 11 countries state that this is partially true. The ISA Core Vocabularies are only well known and actively used in 1 country (Slovakia), while this is partially true for three other countries (Slovenia, Finland and Italy).

Finally, 8 countries have a strategy in place for the use of unique identifiers, while 7 countries have a systematic approach regarding interoperability testing and only 3 countries use registries for managing generic components for their ICT infrastructure. Only a few countries such as Germany, Slovakia and Italy are active in all these areas.

***Good practice***

***Accessibility map for firemen (the Netherlands)***

***Use of key authentic registries and standardised data exchange***

Dutch firemen can now have access to an accessibility map delivering detailed information about the building(s) where a fire occurs (coordinates, building type, residence, purpose of use, etc.). The system is based on the key authentic register Addresses and Buildings (BAG) which follows a comprehensive data model based on the national standard NEN 3610 which in turn is based on the ISO 19100 series of standards. The BAG data model is compliant with INSPIRE specifications and extends the INSPIRE minimum requirements. Municipalities contribute to the maintenance of the BAG delivering information on new buildings to the Dutch Kadaster, who is responsible for managing the BAG, in XML format, while the Kadaster is delivering data in XML and GML to other public authorities that need the data for their own purpose.

***Good practice***

***LoG-IN (Germany, UK and Belgium)***

***Re-usable components based on open standards***

The LoG-IN Generic Information Infrastructure (GII) is a powerful infrastructure owned by 35 local authorities from the UK, Germany and Belgium. It is based on open standards, XML/GML and web services such as WMS, WFS and CSW. It provides to the local authorities a series of re-usable components that allow them to build powerful web applications using only a browser. The GII allows local authorities to manage and publish their geodata supporting a multi-channel approach: web, mobile, pad, web services, Google Maps, Google Explorer and basically every OGC compatible system. Businesses can tap into the databases and use it in their own websites or even business processes.

### *6.3 Assessment*

With regard to the standards and improved interoperability as a key condition for a successful integration of location information in e-Government the following three key observations can be made:

1. The existence of standards and specifications is an important starting point for a successful integration of location information in e-Government processes. Nevertheless, it is not enough; it is **necessary to analyse specific requirements for e-Government processes, to integrate those requirements in the standardisation efforts and to permanently align standardisation and interoperability initiatives** through joint efforts (e.g. joint working groups). It is advisable to maintain a repository of those standardisation and interoperability initiatives.

2. **Countries that are actively involved in the standardisation process of the GI- and e-Government communities usually apply the standards and specifications originating from these standardisation processes in a more systematic way**. These countries usually also work – albeit in a testing environment – on new emerging standards and technologies. The early implementation of standards and draft specifications seems to pay off in later stages of implementation.
3. **Knowledge about and active application of the INSPIRE specifications seems to be relatively lacking in many Member States**. This might impede successful implementation of INSPIRE and create potential barriers for further integration of location information in e-Government processes.

Good practices in the alignment of standards, interoperability and standards strategies, and the application of standards lead us to the following three lessons:

1. **More and more regular e-Government processes have standardised web service interfaces integrated**. The approach in which the services are conceived as re-usable components that can be integrated in several sectors and in many applications for citizens, businesses and governments, seems to provide the best results.
2. **A comprehensive architectural document integrating and explaining the relevant location information and e-Government standards** (and their relationship), provides a good basis and clear insight in how they can be used to build e-Government services. Regular revisions are needed to keep pace with the fast and continuous technological changes.
3. **The application of semantic standards should form the basis for the development of authentic registries**. The INSPIRE specifications are a starting point, allowing the integration of specific requirements and the development of extensions for specific thematic fields through the application of the same principles and methodology.

# 7. Cost benefit focus

*The integrated use of location information in governmental processes will deliver a wide range of benefits, not only to public administrations themselves but also to society in general. This chapter discusses the benefits of a better integration of location information and services in public sector processes, highlighting the different types of benefits the EULF can generate. The chapter also presents several good practices of how the use of location information in government provided significant benefits.*

## *7.1 Different types of benefits EULF can generate*

There are various benefits studies relevant to the publication and use of location information in an e-Government context. These studies address benefits in many different areas: benefits of INSPIRE, benefits of national and sub-national SDI, economic studies concerning location information, e-government benefits, benefits of open data and ICT, and interoperability benefits.

In recent years, there has been a significant increase in the number of benefits assessments studies, and both public agencies and private sector companies are involved in executing these studies. More and more countries in Europe are carrying out the studies in response to the requirements of the INSPIRE monitoring reports. The EULF survey on the use and integration of location information also collected information on Member States' activities of monitoring the benefits of using and integrating location information. The results of the survey show that in several Member States measuring the benefits of location information is only done in the context of the INSPIRE monitoring and reporting process. In some Member States, such as Croatia and Lithuania, measuring and monitoring the benefits of the use of location information is subject of time-limited projects and EU funded projects. In Germany, it is mainly the maintenance of the technical components of the national SDI that is monitored, and not the actual use and benefits of location information. Switzerland and Poland consider the results of an analysis of the geo-information market as a valuable input.

A general observation that is often made is that it is still difficult and complicated to measure the benefits and the costs in quantitative terms. But, what the existing studies clearly show is that the benefits are generally (much) higher than the costs. These studies form the foundation to identify the potential benefits and help to identify the existing approaches to evaluate the benefits. The studies also identified good practices. Based on the analysis of existing benefits measurement approaches and studies, an EULF benefit approach can be developed that allows us to fully grasp and understand the benefits of a wider and more integrated use of location information in e-government. This approach is built around two key elements: the inclusion of different *levels* of benefits and of different *types* of benefits.

As the EULF focuses on benefits (and the associated costs) of initiatives at multiple levels ranging from members state level to organisation, the approach has to cover

the identification and evaluation of these benefits at different levels. Following the approach of Bouckaert and Halligan (2008)[18], three levels of benefits can be differentiated: 1) individual organisation, 2) a policy process/practice, and 3) the consolidated nation (government)-wide level. Also in the context of the EULF, it is important to be aware that benefits of an integrated use of location information will be situated at different levels. The micro benefit is at the level of an individual (public or private) organisation (or even an individual in the case of a citizen) and its interface with other organisations or citizens. The intermediate benefit is at the level of a consistent policy process, meanwhile the macro benefit is national (government) wide.

Benefits of location information can also be organised into three main types of benefits: benefits for public administrations, benefits for businesses and citizens, and broader benefits. This categorisation is strongly based on the classification of the beneficiaries, and categorisations applied in the benefit studies such as the ones from Catalonia, Lombardy, and Denmark. Existing benefits studies also helps us to find specific examples of each of these three types. Benefits for public administration include cost and time savings, simplification of processes, improved policy making, increased collaboration and coordination and improved quality of processes. Benefits for citizens and businesses include cost or time savings, better service delivery, delivery of new services or products, improved transparency, and greater participation. Examples of broader – socio-economic benefits – of a wider and more integrated use of location information are the establishment of new companies, job creation, higher citizen engagement, improved trust in the public sector and administrative simplification.

## *7.2 Benefits of location information at Member State level*

*Benefits for government*

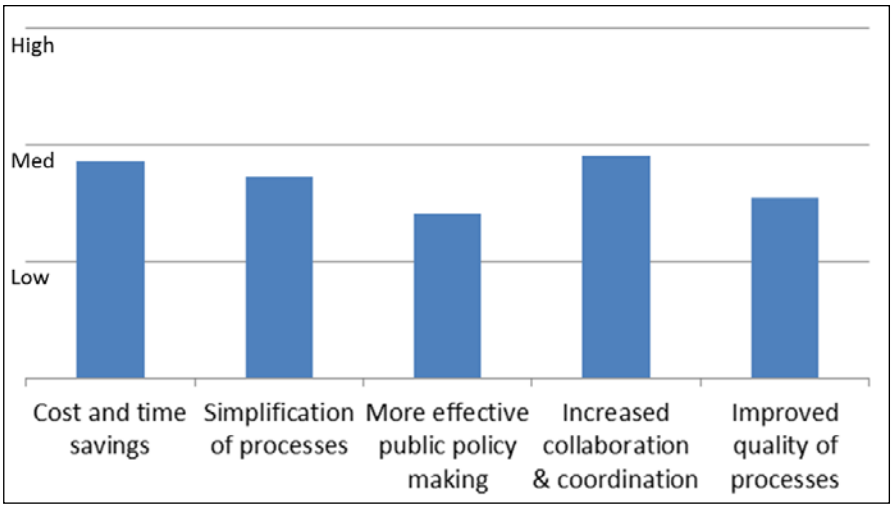
Location information is seen as an important asset for government and public administration, for the execution of public sector activities. A wider and more integrated use for location information, both in processes in which location information already plays a central role and in processes in which the use of location information is still emerging, can provide many benefits for government. Several benefit studies strongly refer to cost savings as the important benefit for public authorities. For example, the Catalan (2008)[19], Lombardy (2009)[20], and Dutch (2009)[21] studies highlight all the benefits of cost savings. Other studies justify process simplification as an important benefit, such as the one of JRC on spatial data use for the preparation of environmental reports (2010)[22]. Finally,

[18] Bouckaert, G., and Halligan, J., 2008. Managing Performance – International Comparisons. London/New York: Routledge.
[19] Garcia Almirall, P., Moix Bergadà, M. Queraltó Ros, P., and Craglia, M., 2008. The Socio-economic impact of the Spatial Data Infrastructure of Catalonia. JRC Scientific and Technical Reports.
[20] Craglia, M., Campagna, M., Piccin, A., De Luigi, A., and Laffi, R., 2009. The Socio-Economic Impact of the Spatial Data Infrastructure in Regione Lombardia. JRC Scientific and Technical Reports.
[21] http://www.geonovum.nl/sites/default/files/20091123_KBA_INSPIRE_definitief.pdf
[22] Craglia, M., Pavanello, L., and Smith, R.S., 2010. The use of spatial data for the preparation of environmental reports in Europe. JRC Scientific and Technical Report.

more effective public policy making, increased collaboration and coordination, and improved quality of processes are also seen as benefits for governments (see e.g. the Finnish INSPIRE benefit study[23], and GIDEON monitoring in The Netherlands (2009)).

The EULF survey provides a first assessment of the potential benefits of the EULF at Member State level. Member States reported to what extent different types of benefits of the use of location information in e-Government processes and application were observable in their country. Although differences between different benefits are rather small, at this stage, the most significant benefit of using location information in e-Government seems to be the increased collaboration and coordination between involved organisations. While Member States also reported benefits in terms of cost and time savings, simplification of processes and improved quality of processes, more effective public policy making was the least identified benefit.

***Figure 6 Benefits of location information for government***




Benefits of location information in e-Government most clearly prevail in public sector processes in which location information has been integrated. The examination of the use and integration of location information in real processes provides evidence on the benefits of location information to government. First of all, in several processes improvements in the quality of the process are observed, through the combination and integration of administrative and location data from many different sources. As an example, in Sweden the use and integration of location information in the statistical production process led to improvements in the production process and in statistical information of significantly greater quality. Using and combining information from different sources can not only improve the quality of processes, but can also lead to more effective public policy making. This was demonstrated in the context of the cross-border Log-IN project, where a Local Business Guide was created, combining location information with information of the

[23] http://inspire.jrc.ec.europa.eu/events/conferences/cost_benefits/Finland_JaanaMakela_151012.pdf

authentic registration of companies. At municipal level, this leads to a dramatic change in the process of public policy making in the area of economic policy. While before economic policy was strongly guided by instinct, the integration of administrative information and location information led to a better informed decision making processes.

The use and integration of location information in government processes can also provide cost and time savings to public administrations. Making location information widely available, easily accessible and readily usable will lead to efficiency gains, such as time savings in finding and accessing data, time savings in internal processes, reduced costs of integrating data, etc. In many domains, location information can support the re-design and simplification of government processes. This was demonstrated in the spatial planning process in the Netherlands. Although increased collaboration and coordination is a necessary condition for realising a better use and integration of location information in a multi-actor environment, the use of location information will also further enhance collaboration and coordination between several actors. A good example of this is the cross-border project called 'The Locator' which aimed at collecting and making available "business site information without borders".

***Good practice***

***The Locator (Belgium, Germany and the Netherlands)***

***Increased collaboration and coordination***

'The Locator' is a four-language, multifunctional information portal for enterprise locations in the Euregio Meuse-Rhine. Through this portal, users can find information about available plots on business parks, information about existing companies on those business parks, information about the availability of commercial real estate and information about the Euregio and settlement conditions. The portal is developed and used by several Belgian, German and Dutch public administrations.

'The Locator' is a good example of how location information can be used to enhance collaboration and coordination between different organisations. A key result of this project, in which Belgian, German and Dutch partners were involved, was an increased collaboration between these partners. Through the project, partners gained insight into and shared information about the supply and demand of industrial sites not only in their own region, but also in the adjacent zones. The development of cross-border internet information portal for monitoring industrial sites allowed the partners not only to present themselves but also to operate as one economic region.

*Benefits to citizens and businesses*

Better integration of location information in government processes also provides direct benefits to citizens and businesses. According to several studies, the delivery of new services or products is a frequently mentioned benefit for this type (see e.g.

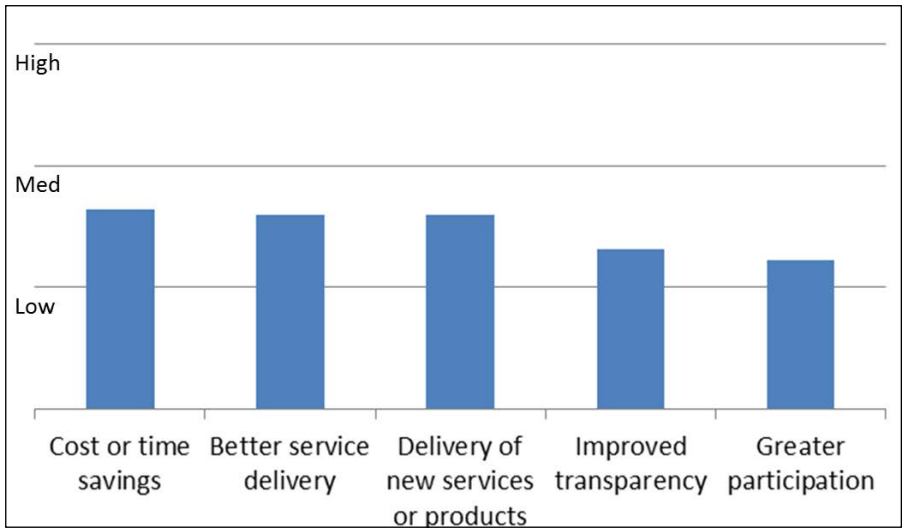
Vickery's report on the economic impact of reuse[24] (2012), Boston Consulting Group study on US consumers and businesses benefits[25] (2012), Consultingwhere's market study[26], and Oxera's report on the economic impact of geo-services[27] (2013)). Only a few studies refer to other benefits for citizens and business, such as better service delivery, cost savings due to less red tape, improved transparency, and greater participation (see for example the social benefit study of Lantmäteriet in Sweden (Rydén, 2013[28]).

In the EULF survey, Member States were asked to indicate to what extent five types of benefits to citizens and business actually occur in their country. Compared with the benefits to public administrations, the benefits to citizens and businesses seem to be slightly less pronounced. According to the examined Member States, the integration of location information mainly seems to contribute to cost and time savings for citizens and businesses. Also improvements in service delivery and the delivery of new services or products are observed in several Member States. Only few Member States already see an impact of location information in terms of improved transparency and greater participation of citizens and businesses in the policy process.

Benefits of integrating location information in e-Government can mainly be seen in the processes in which this integration takes place. The analysis of processes in different domains and in different Member States provides evidence on how each of these benefits actually occurs. One of the (potential) benefits of using location information in e-Government is that citizens and businesses have better access to more correct and up-to-date information on different issues. Location information can make it easier for citizens and businesses to find information from governments. Presenting administrative information together with location information will make it easier to communicate and understand public sector activities and decisions, which improves the transparency of government. Transparency and coherence in the public sector will also increase, if the same data are used across the entire public sector. A typical example of the use of location information to increase transparency are the 'What's in Your Backyard' applications, that allow the public to view environmental and other data for their own neighbourhood. Moreover, location information can also increase the opportunities of citizens and business to participate in government processes, and make these processes more participatory.

[24] http://ec.europa.eu/information_society/policy/psi/docs/pdfs/report/final_version_study_psi.docx
[25] http://www.bcg.com/expertise_impact/industries/technology/publicationdetails.aspx?id=tcm:12-109383&mid=
[26] http://www.consultingwhere.com/press-releases/highlights-of-2012-uk-location-market-survey-released/
[27] http://www.oxera.com/Latest-Thinking/Publications/Reports/2013/What-is-the-economic-impact-of-Geo-services.aspx
[28] http://inspire.jrc.ec.europa.eu/events/conferences/inspire_2011/presentations/46.pdf

***Figure 7 Benefits of location information to citizens and businesses***

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The impact of location information in terms of better service delivery to citizens is clearly visible in emergency situations. In case of flooding, fire or natural disasters, location information is crucial for a successful response of emergency services. In several domains, the use of location information in government made it possible for government to provide new services and products to their citizens and business. This is demonstrated in the area of economic policy, where the online provision of business information has become a new service of governments to citizens, but also allowed governments to provide many additional products and services to businesses in their region, e.g. information on major road works that might affect their business or on the variety of governmental services that are provided to businesses.

While the integration of location information in processes allows governments to realise significant cost and time savings, there can also be significant cost and time savings for citizens and business involved in these processes. A good example of this is the Scottish ePlanning website.

***Good practice***

***The ePlanning Programme (Scotland)***

***Cost savings for citizens and businesses***

The introduction of the ePlanning Programme can be seen as an important change in the Scottish planning service, making the service simpler and more accessible. ePlanning has allowed faster and more transparent decisions, through the use of online technologies and location data. The usage of the ePlanning website was higher than expected. The website for submitting planning applications or appeals anywhere in Scotland already saved applicants more than €8 million in 2012, and it was estimated that application will save an estimated €52,5 million over first 10 years of the project. The improved service has also increased efficiencies in the public sector, providing savings to businesses and offering citizens greater confidence in the process. It is expected that the website will save all planning authorities €10 million over the first 10 years.

*Broader benefits*

While the better integration of location information in e-Government provides many direct benefits to governments, citizens, and businesses, it will also contribute to the realisation of broader - economic and socio-economic - benefits. As mentioned before, the economic benefits of location information have been subject of many studies. Most of these studies refer to the promotion of economic growth as a result of an expanding market for location information products and services. Estimates of the scale of this growth vary considerably but are generally of the order of at 5-10% per year. The study by Oxera estimated that the Geo services sector generates between US$150 billion and $270 billion in revenue globally every year. At the European level the findings of a Dutch research project[29] suggest that the total economic value of the Dutch location information sector in 2008 was €1.4 billion while a similar study carried out in the United Kingdom estimates that the market for location related software, professional services, data and hardware in 2012 was nearly €1.5 billion (ConsultingWhere, 2012). In The Netherlands, the association of private sector companies, GeoBusiness Netherland[30], estimates annually the market size for companies only. The size has slightly been reduced from €968 million in 2009 to €811 million in 2012 (GeoBusiness Netherland, 2012).

Many studies also refer to the impact of an expanding geo-ICT market on job creation. The findings of the Dutch study suggested that nearly 15,000 full time

[29] Castelein, W.T., Bregt, A.K., Pluijmers, Y., 2010. The economic value of the Dutch geo-information sector. International Journal of Spatial Data Infrastructures Research, 2010, 5: 58-76.

[30] http://geobusiness.nl/actueel/nieuws/geobusiness-nederland-presenteert-de-marktmonitor-2012

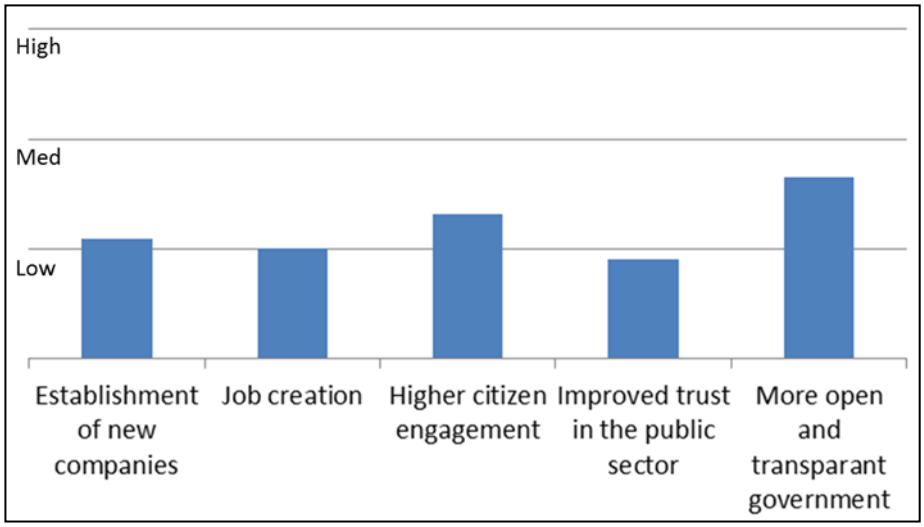
employees were working on location information products and services in 2008 while a study commissioned by the US National Research Council [31] (2013) estimates that more than 100,000 graduates are already working in areas closely related to GIS and geospatial analysis in the United States. A study of the US geospatial industry suggests that it has generated at least 500,000 jobs in the United States and that geospatial services delivery efficiency gains that are many times the size of the sector itself creating a lasting source of competitive advantage for the country as a whole (Boston Consulting Group, 2013).

The use of location information by government will also have an impact on the relationship between government and its citizens. Several trends can be distinguished: the increasing number of policies and actions to make public sector information publicly available, the involvement of citizens in the creation, management and dissemination of location information and the use of location information to enhance citizen participation in decision making. These trends will not only results in a growing participation of citizens in the formulation, execution and evaluation of policies, but also increase the trust of citizens in the public sector. If location information is used to deliver better services, to take better decisions, and to be more transparent about the process by which services are being delivered or policies are being implemented, location information will increase citizens trust in government and the public sector. Only a few previous studies were able to demonstrate the higher citizen engagement and the improved trust in the public sector as broader benefits. Finally, location information might also be a driver for transformational changes in public administration. Information can be seen as a key resource in public administration, as it is the primary input to and the primary product of government activity. The contribution of location information as a part of e-Government will not be restricted to increases in the quality, productivity or efficiency of existing public sector activities and processes, but using and integrating location information might also lead to radical changes and improvements in government processes and activities. In particular, the realisation of a more transparent and open government can be a key of using and integrating location information.

The EULF survey demonstrates that broader benefits of integration location information are less apparent – or visible – to the responding Member States. Moreover, these broader benefits are often related to the public sector itself. According to the examined Member States, the integration of location information mainly seems to contribute to a more open and transparent government. Also an increased citizen engagement is already observed in some Member States, while less evidence is found for the establishment of new companies, the creation of new jobs and especially improved trust in the public sector.

[31] National Research Council Report (2013). Future U.S. Workforce for Geospatial Intelligence.

***Figure 8 Broader benefits of location information***




The analyses of the use and integration of location information in real processes shows how benefits of location information often go beyond these processes. There are several cases in which the integration of location information in public sector processes leads to broader socio-economic benefits. In many Member States, information on urban planning, mobility or environmental issues is made available to citizens through different channels, which leads to a better understanding and appreciation of policy measures in these domains among citizens and a more open and transparent government. However the general impact on citizen engagement and trust in the public sector is still difficult to assess.

***Good practice***

***'GeGIS - Generic GIS for e-government' in Flanders (Belgium)***

***Growth, innovation and new jobs***

In 2006 the Flemish government started to develop a 'generic e-government GIS' (GeGIS). The aim of GeGIS was to develop a fast and easy-to-use GIS to view and manage spatial data. One of the first processes supported by GeGIS was the registration of agricultural parcels by farmers. The 'Agriculture e-portal' that was built with GeGIS, allows farmers and agriculturists to consult their data and fill in and submit online forms. In 2008 the e-portal was honoured with a Belgian e-government award in the category "improved service delivery to businesses".

The GeGIS project provided benefits to government (efficiency gains, faster data collection, better data) and to citizens and businesses (time gains, reduced response time, decrease of administrative burden). Moreover, the project also led to broader socio-economic benefits, as several innovative geo-ICT companies were created, bringing growth, innovation and new job opportunities in the Flemish geo-ICT sector.

There are some examples of how the use and integration of location information contributed to the creation of jobs and the establishment of new companies. The development of the IDOS multi-modal journey planner in the Czech Republic, was undertaken by a public-private-partnership between the Ministry of Transport, the Czech Public Transport Operators and allowed all mobile operators in the Czech Republic to create new business opportunities, since they started selling SMS-based transport information. Also the integration of location information through the development of GeGIS in Flanders, resulted in several broader benefits.

### *7.3 Assessment*

With regard to the measurement and monitoring of the benefits of using and integrating location information, the following key observations can be made:

1. There are many studies, but they tend to **focus on one specific aspect of using location information** or address the benefits of location information from a single perspective.
2. Many stakeholders face difficulties in measuring benefits and costs in quantitative terms, **monitoring is often done in a rather fragmentary and qualitative manner**. In many Member States, measuring and monitoring the benefits is limited to the monitoring and reporting activities that is required by INSPIRE or is done in the context of time-limited projects.
3. At this moment, **the benefits of location information for government seem to be more pronounced** than the benefits to citizens and governments and broader socio-economic benefits of location information The main observed benefits of location information are increased collaboration and coordination between governments, simplification of public sector processes, and cost and time savings for government and for citizens and businesses.

Good practices of maintaining a cost benefit focus on location information take into account the following three lessons:

1. The availability of an abundant number of services and data within the context of an SDI allows **the creation of new applications and businesses**, but should be organised and supported by a series of measures to make this happen.
2. There is a **need to focus on different types of benefits, including benefits for government but also benefits to citizens and businesses, and even broader socio-economic benefits**, when measuring the benefits of location information but also when implementing new practices or actions. Benefits of location information should be measured at different levels: although policy makers are often interested in a government wide assessment of the benefits of location information, these benefits are often

more visible and more pronounced at organisational level and at process level.

3. The development and implementation of **a consistent and systematic approach to measure benefits** that includes monitoring of changes and trends in the benefits of location information through time, is more valuable than single measurements.

# 8. Committed partnerships

*Many initiatives or communities are developing approaches to the sharing and use of location information either as a core activity or a by-product of other activities. It is essential that committed partnerships are developed to share good practices and ensure that different initiatives take account of respective needs and expectations and build on what each is doing. This chapter builds on the analysis of stakeholders in the EULF Strategic Vision and summarises what needs to be done in terms of engagement. The chapter also demonstrates how committed partnerships support and facilitate the integration of location information in the context of e-Government processes.*

## *8.1 Stakeholder mapping*

The EULF project has a broad range of core stakeholder groups. These groups, together with the nature of the engagement, are summarised in table 18.

***Table 18 Stakeholder Groups***

| STAKEHOLDER | NATURE OF ENGAGEMENT |
|---|---|
| ***ISA Programme*** | |
| DIGIT/ISA Programme | ISA programme management and budget; e-Practice workshops |
| Reusable INSPIRE Reference Platform (ARE3NA) | Collaboration, Working Group, synergies |
| ISA Governance Groups<br>Joint ISA-INSPIRE Working Group (for the EULF and ARE3NA geospatial ISA actions) | ISA programme management and budget<br>Inputs, recommendations, promotion |
| Other ISA Actions (e.g. Core Vocabularies, Base Registries, European Interoperability Architecture, ARE3NA) | Synergies and evidence |
| ***INSPIRE*** | |
| INSPIRE Regulatory Committee | Consultation |
| INSPIRE National Contact Points (NCPs) | Consultation, advice, promotion; Working Group; Member States' location frameworks, best practices, case studies |
| INSPIRE Maintenance and Implementation Group | Consultation; EULF inputs to INSPIRE policy evaluation; Joint action; Working groups of thematic experts |
| ***EU Institutions*** | |
| DG Environment | Consultation; Working Group; Relationships with SEIS; Policy reviews and adaptation |
| Other Policy DGs (ENTR; SANCO; MARE; MOVE; CONNECT; REGIO; AGRI; TAXUD; ECHO; RTD) | Consultation; Policy reviews and adaptation |
| Eurostat | Consultation; Working Group |

| STAKEHOLDER | NATURE OF ENGAGEMENT |
|---|---|
| Commission Inter service group on Geographic Information (COGI) | Communication and consultation within EC services |
| Joint Research Centre | Consultation; Working Group |
| European Environment Agency | Consultation |
| ***Member States' e-Government*** | |
| Member State e-Government authorities | Survey, ongoing consultation, promotion; Working Group; Member States e-Government and ICT frameworks, best practices, case studies; Policy reviews and adaptation; Service reviews and adaptation |
| Cross-border collaboration projects (e.g. Powered by INSPIRE, Intelligent Transport Systems) | Consultation; pilots and case studies; identifying barriers, promoting EULF and relevant solutions |
| ***Interest Groups / Communities*** | |
| Preparatory Committee for UN-GGIM Europe | Consultation, coordinated activities |
| Standards bodies (CEN, ISO, OGC, W3C, OASIS, OMG) and their focus groups on e-Government of relevance to location | Consultation, standards provision / adaptation |
| EuroGeographics - INSPIRE KEN | Knowledge exchange |
| Open Source Software communities | Consultation, solution provision |
| Research / academic groups | Consultation, requirements, solution provision |
| Volunteer Geographic Information communities | Consultation, requirements, solution provision |
| ***Major European projects / initiatives*** | |
| European Location Framework (ELF) | Pilots, infrastructure and product provision |
| eENVplus | Pilots, infrastructure provision |
| smeSpire | INSPIRE impact assessment, potential stakeholder group for EULF consultation, potential re-use of training package |
| SmartOpenData | Pilots, lessons learned, case studies, re-usable data assets |
| ***Organisations outside government*** | |
| Private sector | Consultation, requirements, take-up |
| Non-profit / voluntary sector | Consultation, requirements, take-up |

The EULF project builds on and takes into account related frameworks and initiatives. Key examples include:

**INSPIRE** – INSPIRE is the foundation on which EULF will build. It has created a large body of standardised location information and services, within both general and environmental data themes. Key tasks for the EULF will be to work with EU and Member States stakeholders to determine how INSPIRE could be used in different policy areas and support cross-border applications. An INSPIRE Maintenance and Implementation Group (MIG) has been set up and this will be an important point of

consultation on plans that impact respective activities, as well as on specific actions and recommendations that are being proposed by the EULF. There is also an INSPIRE Policy Evaluation Project, to which the EULF project should provide input.

**UN-GGIM Europe** - The UN initiative on Global Geospatial Information Management (UN-GGIM) aims to promote the development of geospatial information to address global economic, social and environmental challenges. The Preparatory Committee for UN-GGIM Europe is evaluating how European experts can influence policy and promote good practices to support this aim. When it is established formally, the UN-GGIM Europe Committee will provide regional inputs to the work of the global UN-GGIM Committee of experts. The Preparatory Committee for UN-GGIM Europe is considering priorities in parallel with the work of the EULF. There will be a mutual interest in the policies, standards and mechanisms to improve interoperability. It will be important to ensure that there is alignment in the work programmes and communications with stakeholders, as well as in the resultant policies and approaches that are agreed. Outputs should be re-used between the two initiatives where applicable.

**European Location Framework (ELF)** - The ELF[32], a project under the CIP ICT PSP[33] programme of the EU, run by Norway and Finland, is developing a pan European infrastructure and products incorporating harmonised core geospatial data aimed at making it easier to build cross-border applications. The project will also include a series of pilots in particular sectors. The ELF will be an important stakeholder in identifying strategies and solutions to improve cross-border support mainly related to reference geospatial data. The EULF and ARE3NA will be interested in potential use cases and demand for the ELF, and the pilots could potentially be used as case studies.

**eENVplus** - eENVplus[34] is similarly a CIP ICT PSP funded project which aims to integrate infrastructures and create an operational framework for cross-border sharing of environmental data, compatible with INSPIRE. The project will include a series of pilots to support various environmental scenarios and will develop a multi-lingual thesaurus framework, tools for data harmonisation and validation and a series of e-learning modules. All of these will be relevant in their own right to the EULF. The eENVplus concept may also be applicable to other policy areas and scenarios.

**smeSpire** - smeSpire[35] is an FP7 funded project to enable and encourage participation of SMEs in making environment content available, exploiting the opportunities afforded by INSPIRE and related technologies such as Linked Open Data, Sensor Web and cloud computing. The project assesses the market potential for SMEs in relation to INSPIRE, create a best practice catalogue in the management of environmental content, develop a multilingual package to train

[32] http://www.elfproject.eu/
[33] Competitiveness and Innovation framework Programme, see http://ec.europa.eu/digital-agenda/en/ict-policy-support-programme
[34] http://www.eenvplus.eu/
[35] http://www.smespire.eu/

environmental analysts, and create a network to share knowledge with research centres, environmental agencies, technology providers and digital content providers. EULF will be particularly interested in the assessment of potential market and growth impacts afforded by SMEs and will take account of the barriers and opportunities identified in defining its guidance and actions. The smeSpire community could also be consulted on further considerations relevant to the EULF.

**SmartOpenData** - This FP7 funded project, entitled 'Open Linked Data for environment protection in Smart Regions' is developing a series of practical applications of Open Linked Data through five pilots in the field of environmental protection and research, such as Biodiversity protection in different European protected areas and e-Government. Location information will feature significantly in these applications. The objectives of the project are 'exploitation of open data for policy making', 'fostering participation of citizens', 'generating new products and services' and 'collaboration of researchers'. There is therefore a strong link with the scope and objectives of the EULF. The project will provide valuable case studies and lessons learned, as well as re-usable assets that may be exploited in wider contexts.

### *8.2 Steps towards successful partnership approaches*

*Improved communication, coordination and collaboration with stakeholders*

As the overall technical coordinator of INSPIRE, JRC.H6 (Digital Earth and Reference Data Unit), already has an institutional role to identify the synergies between INSPIRE, relevant ISA activities, selected EU co-funded projects and initiatives, and the Standards Developing Organisations. Therefore, explaining why the JRC is coordinating the EULF and ARE3NA in order to further strengthen and deepen these pre-existing relationships.

Furthermore, many other Commission services are also responsible for activities concerning the availability and interoperability of spatial information and services. This includes both EU co-funded projects and tenders and activities that may have policy implications such as United Nations Global Geographic Information Management (UN-GGIM). All these activities connect with stakeholders in Member States – either through direct involvement of experts, ad-hoc arrangements such as consortia, or through formal representation in expert groups.

Sharing information between these activities, and re-use of their outcomes is of critical importance. Effective communication, coordination and collaboration is essential – but a challenge, as no single project or coordinating body has the necessary authority and means to do this. Therefore, it is recommended that coordination should be institutionalised by making more effective use of existing or new coordination mechanisms. For example, by using the Commission Inter-service Group on Geographic Information (COGI), the INSPIRE Maintenance and Implementation Group or the planned European branch of UN-GGIM.

*Synergies between ISA Programme and INSPIRE*

European Union Directive 2007/2/EC for the establishment of an infrastructure for spatial information (INSPIRE) requires EU countries to share spatial environmental data and information according to a number of agreements, laid down in the Directive, in the Implementing Rules Legal Acts (IRs), and in technical guidance (TG). The infrastructure will support decision making in support of environmental policies, and of policies that have an impact on the environment. INSPIRE is a multi-purpose infrastructure, meaning that it can be used for sharing and re-use of spatial information also in other policy domains.

INSPIRE addresses, within its scope, all levels of interoperability identified in the European Interoperability Architecture (EIA): legal, organisational, semantic and technical. In fact, there are many synergies to gain between INSPIRE and ISA. Not only is ISA important for INSPIRE, but in addition the experience gained through the development of Implementing rules and their implementation in Member States will inform and support the objectives of ISA programme.

This natural synergy between INSPIRE and the ISA programmes has resulted in this ISA Cluster on Spatial Information and Services targeted towards the wider integration and use of INSPIRE in public administrations. Since 2012, the EULF has made valuable progress towards aligning the broader objectives of two programmes. Concrete examples include the work on the INSPIRE Registry, the Core Vocabularies, the registration of INSPIRE assets in the European Federated Interoperability Repository (EFIR), and discussions with the Common Information Sharing Environment (CISE) for the EU maritime surveillance.

*Strategic relationships with activities outside the ISA Programme and coordination*

As outlined earlier in this document there are a number of stakeholder projects and initiatives out of the ISA Programme that are of particular interest. Two of these projects are considered below to understand their relationship with the EULF and demonstrate how synergies are being tackled and put in place.

The *European Location Framework (ELF)* project aims at building cross-border services on INSPIRE compliant reference data using National Mapping and Cadastral Agencies authoritative data. The EULF collaborates with ELF, at the level of legal and organisational interoperability. A common ELF/EULF/ARE3NA workshop was organised in June 2013, and joint meetings are planned for December 2013. JRC staff is in the Advisory Board of the ELF project.

A second example is the *eENVplus project*, that aims to integrate infrastructures and create an operational framework compatible with INSPIRE for cross-border sharing of environmental data. This is relevant to the EULF as the eENVplus experience may be more widely applicable to other policy areas. JRC staff is on the eENVPlus Advisory Board. Furthermore, to ensure close collaboration and alignment with INSPIRE the project kick-off meeting was hosted by JRC.

The table below gives an overview of the coordination activities with the different key stakeholder groups. The coordination between the stakeholder groups is

achieved on the one hand by participating in these groups, and on the other hand by organising targeted meetings and workshops with representatives of these groups (e.g., workshops or events at the yearly INSPIRE Conference).

***Table 19 Overview of the coordination activities***

| STAKEHOLDER GROUP | SCOPE / TYPE OF COORDINATION |
|---|---|
| ISA Working Group on Spatial Information and Services | Primary consultation group to ensure the ISA Actions on Spatial Information and Services align with Member States needs. |
| EC/EEA INSPIRE Consolidation Team | INSPIRE Coordination<br>Link between policies (EULF) |
| INSPIRE National Contact Points | Formal contact points (c.f. Art 19b of the INSPIRE Directive 2007/2), responsible for contacts with the Commission in relation to the INSPIRE Directive. The NCP will be supported by a coordination structure, taking account of the distribution of powers and responsibilities within the Member State. |
| INSPIRE Maintenance and Implementation Group | Issues identified by EULF will be fed into the INSPIRE maintenance and implementation framework, which is driven by Member States. |
| Commission Inter-service Group on Geographic Information (COGI) | Coordination of INSPIRE implementation in Commission;<br>United Nations Global Geographic Information Management; Framework Contracts related to GI |
| INSPIRE-related EU co-funded projects | Regular interaction between relevant Commission Services; identification of synergies. Participation of INSPIRE staff in advisory boards of EU-funded projects. |
| JRC.H.6 internal ISA coordination meetings | Identification of problems and solutions, synergies, budget execution, work plan execution. |
| United Nations Global Geographic Information Management | Commission is represented in the UN-GGIM. |
| INSPIRE Training of EC project officers | JRC is planning INSPIRE-related training to EC project officers. The outcomes from the EULF will be included in the training material as well. |

### *8.3 Partnerships for realising the integration of location information*

Government processes often involve many stakeholders, including public authorities at different administrative levels but also organisations and actors outside the public sector. Businesses, academic institutions and other organisations not only are consumers of government services and products, but can also actively

participate in government processes. The establishment of effective partnerships is needed to ensure the involvement of all stakeholders and the effective use of location information in processes.

Existing practices on integrating and using location information and services in public sector processes demonstrate the need to create and maintain effective partnerships between different stakeholders. In many cases, this includes partnerships between different public administrations that are active in a certain policy area. For instance, in the development of the Digital Exchange platform for spatial plans in the Netherlands, not only the (former) ministry of Spatial Planning was involved, but also the municipalities and provinces. In some cases, organisations from different policy areas are working together to developed a cross-sectoral solution. There are also several good practices of cross-border partnerships where organisations in different countries and regions collaborate to support the integration of location information in certain policy processes. In the domain of economic policy, two good examples of cross-border collaborative projects were already discussed in this report. In the Locator project partners from Belgium, the Netherlands and Germany are working together to develop an application for finding and exploring available commercial and industrial sites. In the LoG-IN project, partners from different European countries (Belgium, Germany, UK) were involved in the development of a Generic Information Infrastructure. Also in other parts of Europe, effective cross-border partnerships have been set up to support the use and integration of location information in e-Government.

The development of IDOS, a cross-border journey planner for citizens in the Czech Republic, is a good example of how partnerships between public and private actors can help realising the benefits of location information. While the public sector provides the regulation and the institutional support for the service, the private sector is responsible for managing, marketing and developing the service. Some practices are initiated and driven by private companies, but require a – relatively small – contribution from certain public administrations. In Germany the Zoning system for floods, backwater and heavy rains (ZÜRS) was developed by the German Insurance Association in cooperation with several private company in the Geo-ICT sector. The public sector was mainly involved as provider of data and services.

Several practices demonstrate the potential role of central coordinating actors or units in realising a successful integration of location information. In some practices, the agency or body responsible for GI/INSPIRE is taking actions to support and facilitate the integration of location information or is involved in actions set up by the process owners. Geonovum, the Dutch coordination body for geographic information, was responsible for the management of the domain specific standards that were developed for the Digital Exchange platform for spatial plans. But also agencies or bodies responsible for e-Government can contribute to the integration of location information in e-Government processes. In Flanders (Belgium), the GeGIS project to develop a ‘generic GIS for e-government’ was launched by the Flemish E-government Unit, together with the Department of Spatial Planning,

Housing and Heritage of the Flemish government. The initial development of GeGIS was carried out by a private company in cooperation with a university.

The practices also show that existing partnerships sometimes are expanded in order to include new stakeholders. For instance, the infrastructure that was developed in the cross-border LoG-IN initiative was re-used by several municipalities, provinces, regional and national governments outside the original partnership. The 'generic GIS for e-Government' was fully developed as an open software solution, and all stakeholders were able to improve and adapt the code, and new applications and supplements could easily be added. After the original GeGIS project, the solution was further developed, supported by the open source community.

### *8.4 Assessment*

In looking at the range of stakeholders and the engagement to date, the following key observations can be made:

1. The **EULF stakeholder landscape is complex and understanding the needs and expectations of all stakeholders is vital**. The EULF has a broad range of stakeholders: the broad ISA Programme community, EU institutions, the INSPIRE community, Member States' e-Government bodies and projects, major European projects and initiatives, interest communities and organisations outside government.
2. **The EULF project needs to build on and take into account many related frameworks and initiatives**: INSPIRE, UN-GGIM Europe, European Location Framework (ELF), eENVplus, smeSpire, SmartOpenData and many others. First steps in linking to these initiatives have already been taken and coordination activities with the different key stakeholder groups have been undertaken.
3. Existing practices on integrating and using location information and services in public sector processes **demonstrate the need to create and maintain effective partnerships** between different stakeholders. There are many examples of good practices in Member States where collaboration between different stakeholders helps realising the benefits of location information.

To add value through the EULF, the following will have to be taken into account:

1. The EULF will have to work with and work **through a number of other communities** to achieve its aims.
2. It will be important to **consult with a wide range of stakeholders** to understand priorities and to focus attention on practical steps that build on the work of others and deliver benefit to both direct and indirect stakeholders;
3. Examples of **how committed partnerships were established, managed and sometimes managed in the context of specific processes,**

**projects and initiatives** provide evidence on how stakeholders from different sectors, different administrative levels and different countries can be brought together with the aim of promoting and supporting the integration of location information in e-Government.

# 9. Conclusions

This report provides an assessment of the state of play in the different focus areas of the EULF as well as the need for further EULF action in these areas. The assessment builds on and takes into account the many experiences, frameworks and initiatives that already exist at EU and Member State level.

The study gives an overview of the major challenges that the EULF will have to address in order to be successful. Challenges can be found in each of the five focus areas that were examined:

- **e-Government Integration**: In many processes that might benefit from a better and wider use of location information, the current use and integration of location information is still low. Better integration of location information in e-Government requires additional efforts at organisational and technological levels.
- **Policy and Strategy Alignment:** Within existing policies, legislation, strategies, and procurement location aspects are often addressed in an insufficient or inconsistent way, causing duplications, contradictions, gaps and missed opportunities.
- **Standards and Interoperability**: Standardisation efforts and interoperability frameworks exist in ICT, e-Government and GI-communities, and also in different thematic and policy areas. These efforts should be streamlined and aligned through an improved cooperation between the sectors concerned. All Member States could benefit from a more active involvement in the standardisation processes.
- **Cost benefit focus**: Understanding of the benefits of location information is still lacking, as little effort is done to monitor and communicate the benefits of using and integrating location information and evidence of the benefits often is not based on observation but consists of opinions and expectations. Nevertheless, several examples of the integration of location information in e-Government processes demonstrate already concrete benefits for governments, businesses, citizens and society at large.
- **Committed Partnerships**: Many initiatives or communities are developing approaches to the sharing and use of location information either as a core activity or a by-product of other activities. It is essential that committed partnerships are developed to share good practices and ensure that different initiatives take account of respective needs and expectations and build on what each is doing.

The assessment of the conditions of the EULF was built around five priority focus areas, i.e. Policy and Strategy Alignment, e-Government Integration, Standardisation and Interoperability, Cost/Benefit Focus and Committed Partnerships. Also the EULF vision started from the assumption that these five focus areas are priority areas for EULF. This does not mean that other areas were not considered, or that they were considered as less important. During the work on the

EULF vision and the assessment of the conditions, five other focus areas were defined as potentially important: leadership and governance, a user driven approach, awareness and training, funding, and an open data policy. The responses of the GI- and e-Government communities in the Member States on the question "Indicate how important the following issues are for improving the use of location information in e-Government" (with all the 10 focus areas listed) support the need for an EULF and suggest that all issues seem to be important - and also that we need to establish a broader focus than indicated in the initial version of the Strategic Vision. Indeed, issues such as leadership and governance, a user driven approach, training and awareness, and funding are in the top five of the most important issues (integration being the first). This matches well with the observed barriers that impede the use and the integration of location information in e-Government: for example a lack of funding and a lack of knowledge and skills were highlighted as the most important barriers. These observations are also backed the analysis of the Best Practices. For example, the development of the successful journey planners (e.g. IDOS) was not only possible by bringing the right stakeholders together, but in almost all developments a clear leadership and governance model was needed and set-up. This was also the case in the GeGIS project that successfully developed re-usable components under the leadership of the Flemish e-Government body (CORVE) which made the initial investments to develop the generic tools. The different applications such as "What's-in-my-backyard" revealed the need for people with knowledge and skills to develop easy-to-use and user-driven tools and services. Many more examples could be given. This leads us to an important additional conclusion: i.e. that in future work on the EULF, these other focus areas should get attention as well.

The results of the assessment of the conditions will be used for the elaboration of the EULF Blueprint and EULF Roadmap, together with the EULF Strategic Vision and consultations with different stakeholder communities. The results of the assessment will be used as an input for the consultations with different stakeholders and more information (from Member States and best practice cases) will be integrated in future versions of this document.

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Abstract

The European Union Location Framework (EULF) is a set of good practices and actions to promote more effective and efficient use of location information in e-government services. The EULF is part of the Interoperability Solutions for Public Administrations (ISA) Programme, which supports interoperability solutions, sharing and re-use among European Public Administrations.

This report assesses the conditions for an EULF, based on a survey of Member States and an examination of EU policies and work programmes. Five focus areas are being considered initially: policy and strategy alignment, e-government integration, standardisation and interoperability, costs and benefits and committed partnerships. The assessment confirmed their importance in realising and maximising the benefits of location-related information and services. There are various good practices demonstrating that these issues can be addressed and that benefits for governments, citizens and businesses can be delivered. However these good pratices are not universally deployed and there are some significant gaps. The assessment also identified other important issues, including the need for effective leadership and governance, a user-driven approach, an open and balanced data policy, training and awareness raising and appropriately targeted funding.

There is, therefore, a need for an EULF, to build on the good practices and interest from Member States and to develop a framework of guidance and actions that will foster interoperable cross-sector and cross-border sharing and use of location information.

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